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PHYTOLOGIA

An international journal to expedite plant systematic, phytogeographical and ecological publication

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BOTANICAL GARDEN

NEW SPECIES AND NEW RECORDS IN SYMPHYOPAPPUS (EUPATORIEAE: ASTERACEAE)

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ABSTRACT

Symphyopappus decemflorus is described from Brazil with ten flowers in a head and *S. apurimacensis* is described as new from Peru, the first record for the genus outside of Brazil.

KEY WORDS: *Symphyopappus*, new species, Peru, Brazil.

The genus *Symphyopappus* was established by Turczaninow in 1848 for a single Brasilian species with a pappus that tended to detach as a unit with the upper callus of the achene. The genus was maintained and expanded by B.L. Robinson, in his key to the genera (1913), and other works, in spite of the fact that the distinctions from the then accepted broad concept of *Eupatorium* L. were very weak. Only Steyermark (1953) actually synonymized the genus with *Eupatorium*.

Symphyopappus was resurrected by King and Robinson (1971) and more carefully defined by King and Robinson (1978, 1987). Robinson (2002) added a species with uncinate tips on the pappus bristles. As of the latter date, all species of the genus were restricted to Brazil, and all species that were retained in the genus were like other Disynaphiinae in having 5 florets in a head. The two species described below include a species with ten florets in the heads and extend the geographic range of the genus to Peru.

Symphyopappus decemflorus H. Rob., **sp. nov.** TYPE: BRAZIL. Minas Gerais: Serra do Cabral entre o Rio Embaiassaia e o Rio Preto (Mun. Joaquim Feliçio), 7 Jun 2004, campo rupestre, solo arenoso, arbusto 2 m, untuoso ao tacto, capitulo alvo, *G. Hatschbach, M. Hatschbach & O.S. Ribas 77515* (holotype MBM, isotype US). (Fig. 1).

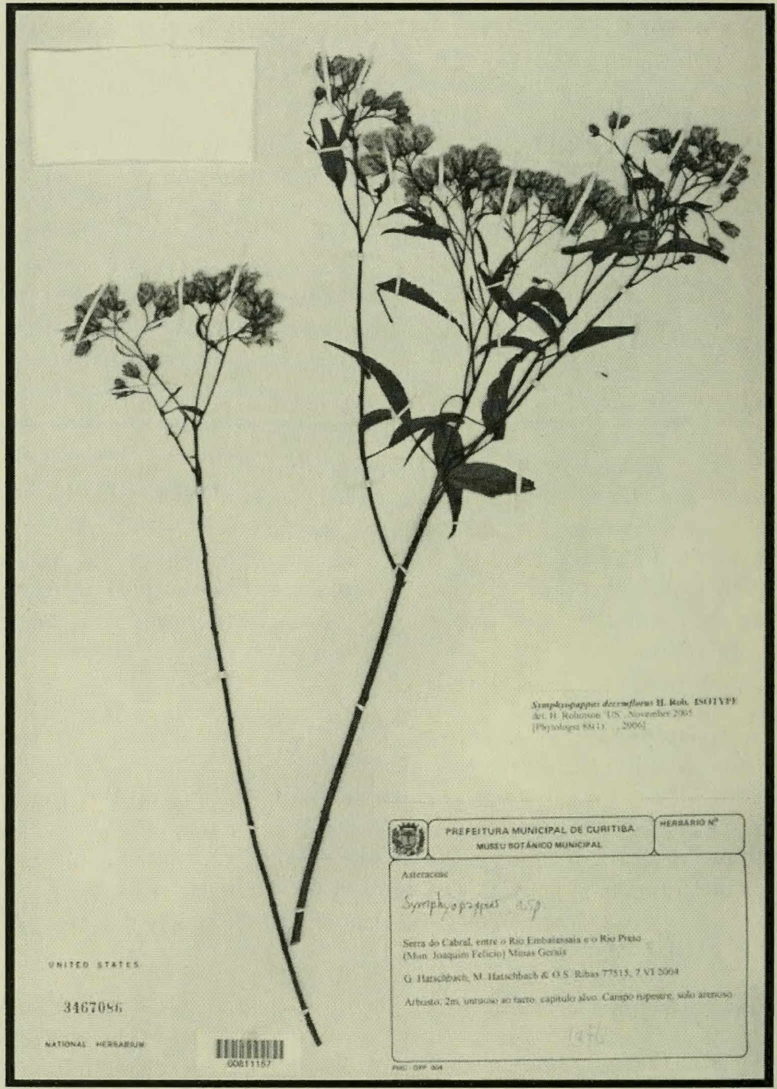
Symphyopappus decemflorus H. Rob. ISOTYPE
det. H. Robinson "US", November 2005
[Phytologia 88(1): ... 2006]
PREFEITURA MUNICIPAL DE CURITIBA
MUSEU BOTÂNICO MUNICIPAL
HERBÁRIO Nº
Asteraceae
Symphyopappus
Serra do Cabral, entre o Rio Embaiassaia e o Rio Preto
(Mun. Joaquim Felício) Minas Gerais
G. Hatschbach, M. Hatschbach & O.S. Ribas 77515, 7 VI 2004
Arbusto, 2m, untuoso ao tacto, capítulo alvo. Campo rupestre, solo arenoso
UNITED STATES
3467086
NATIONAL HERBARIUM

Fig. 1. *Symphyopappus decemflorus* H. Robinson, isotype, United States National Herbarium (US).

A speciebus congeneribus in floribus 10 in capitulo differt.

Dark brownish-green, glutinous shrubs ca. 2 m tall, moderately branched; stems dark reddish, terete, with small glandular dots, without nonglandular hairs; branches slender, internodes mostly 1.5-2.0 cm long. Leaves opposite below, subopposite or alternate above, petioles 0.4-1.7 cm long; blades lanceolate, upper leaves mostly 3.5-5.0 cm long, 0.5-1.2 cm wide, base short-acute, margins closely serrulate in distal ¾, apex caudate-acuminate, both surfaces dark, with dense glandular dots, midrib prominent on both surfaces, 2 pairs of strongly ascending secondaries, 1 from near base, 1 near middle. Inflorescences terminal on leafy stems, rather laxly corymbiform, with slender ascending branches subopposite to alternate; lower bracts foliiform, to 2.5 cm long, distal bracteoles linear, 2-9 mm long; peduncles 2-9 mm long. Heads broadly campanulate, ca. 11 mm high, 6-8 mm wide; involucral bracts subimbricate, ca. 18, in ca. 5 unequal series, 1 or 2 at base linear and dark, others broadly ovate to oblong, 1.5-8.0 mm long, 1.5-2.0 mm wide, margins scarious, apices rounded, outside with many, median, pale striations and dark grooves, distally below tip with patch of small glandular dots; receptacle without hairs or spines. Florets 10 in a head; corollas white, cylindrical, ca. 6.5 mm long, mostly glabrous, basal tube ca. 1.5 mm long, throat ca. 4 mm long, lobes ca. 0.5 mm long, with small glandular dots outside; anther collars ca. 0.3 mm long; thecae reddish, ca. 2.5 mm long; apical appendages rather oblong, ca. 0.45 mm long, 0.27 mm wide, slightly emarginate at tip. Achenes ca. 3.5 mm long, body glabrous, pale apical callus easily detached, with many distorted setulae, micropunctations in regular transverse rows; carpopodium pale, with few differentiated cells; pappus of 30-35 white bristles, 3.0-5.5 mm long, gradually narrowed from base. Pollen grains ca. 25 μm in diam.

Symphyopappus decemflorus is presently known only from the type collection. The slender flexuous branches, caudate-acuminate leaves, and the setulae on the upper callus of the achene are rather distinctive, but the heads with 10 florets are unique in the genus and in the subtribe Disynaphiinae. The subtribe otherwise consistently has 5 florets in the heads. There is no reason to doubt the present new species is a member of the genus, it has the transversely aligned micropunctations of the achene wall, and has the upper callus of the achene detaching as a unit with the pappus. The 10-flowered condition was previously claimed for a species of *Symphyopappus, S. catharinensis*. (King and Robinson, 1974), but that species was very different in details, later proving to be a *Neocabreria* in the subtribe Critoniinae, with hairs inside of the corolla (King and Robinson 1978).

Symphyopappus apurimacensis H. Rob., **sp. nov.** TYPE: PERU. Apurimac: Abancay, Santurni Noe Ampay, 2800 m, 23 Jul 1995, *A. Tupayachi & W. Galerno 2860* (holotype US, isotype CUZ). (Fig. 2).

Dark browinsh-green glutinous shrubs ca. 1? m tall, moderately branched; stems terete, densely gland-dotted, without nonglandular hairs; distal internodes 1.8-2.5 cm long. Leaves opposite, petioles 0.5-1.5 cm long, grading into lamina; blade narrowly ovate to lanceolate, 4.5-11.0 cm long, 1.3-2.8 cm wide, base acuminate, margins serrate with 8-20 teeth, apex narrowly acute, upper surface dark, densely dotted with small glands, lower surface somewhat paler, with more obvious numerous glandular dots; midrib prominent on both surfaces, subtrinervate with stronger more ascending secondary veins 0.7-2.0 cm above base. Inflorescence densely corymbiform, with compact corymbiform branches, with foliiform bracts below, opposite or alternate, 2.0-3.5 cm long, 0.3-0.4 cm wide, distal bracteoles alternate, linear to filiform, 3-5 mm long; branches strongly ascending, uppermost at 20-30° angles; peduncles 0-2 mm long, without non-glandular hairs. Heads cylindrical, 8-9 mm high, 2-3 mm wide; involucral bracts yellowish with darker lines and tips, subimbricate, oblong to narrowly oblong, ca. 12, in 4-5 unequal series, 2-7 mm long, margins scarious, apices short-acute, outside with numerous small glands, bicostate; receptacle glabrous. Florets 5 in a head; corollas white, very narrowly funnelform, ca. 6.5 mm long, basal tube ca. 2 mm long, with numerous small glands outside, throat ca. 3.5 mm long, glabrous, lobes ca. 0.7 mm long, glabrous; anther collars ca, 0.3 mm long; thecae pale reddish, ca. 2 mm long; apical appendage rather oblong, ca. 0.35 mm long, 0.23 mm wide, slightly emarginate at tip. Achenes ca. 2.5 mm long, without setulae, upper callus persistent,

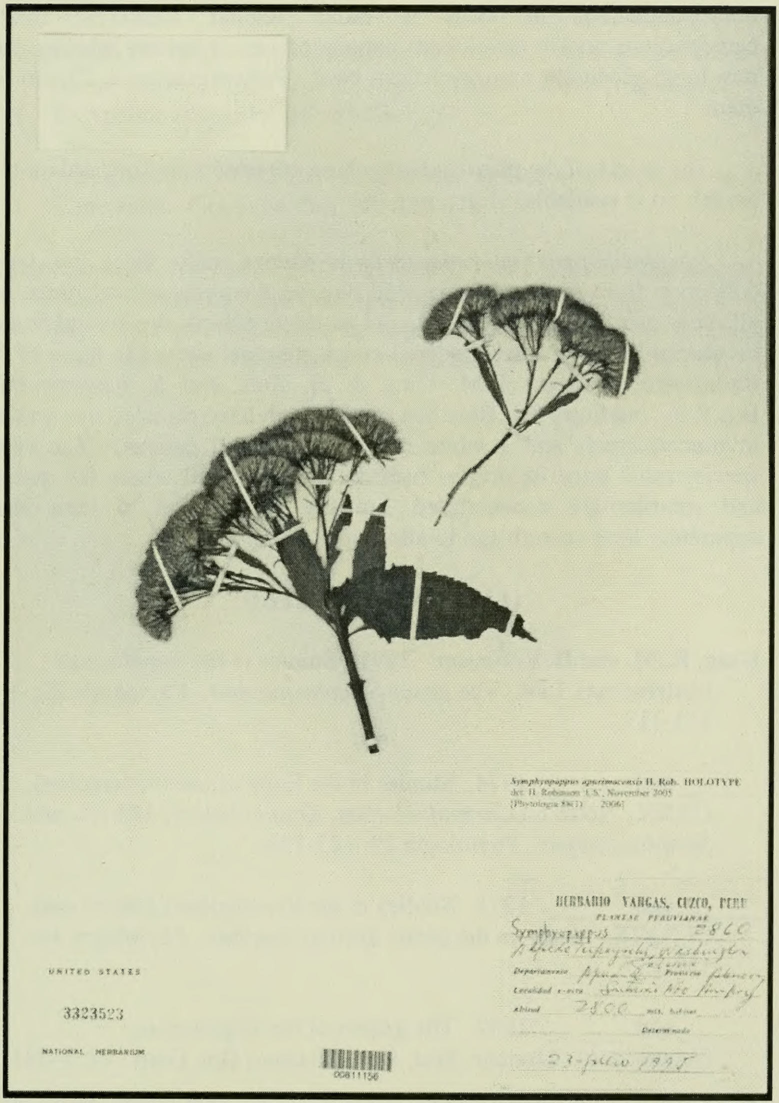

Fig. 2. *Symphyopappus apurimacensis* H. Robinson, holotype, United States National Herbarium (US).

micropunctations in walls in rather regular transverse lines; carpopodium poorly developed; pappus of ca. 23 sordid bristles, 4-6 mm long, gradually narrowed from base. Pollen grains ca. 25 µm in diam.

The height of the plant and branching are uncertain since only a branch tip is available.

Symphyopappus apurimacensis is known only from the type collection from southern Peru, well beyond the geographical range of all other members of the genus. As to relationships, the subimbricate involucral bracts in many unequal series are most similar to those of *S. itatiayensis* (Hieron.) R.M. King & H. Rob. and *S. lymansmithii* B.L.Rob., but these two Brasilian species both have rounded tips on the involucral bracts and a white rather than sordid pappus. The new species must trace its origins back to eastern Brasil where the genus and subtribe are concentrated, but the introduction to Peru was apparently long enough ago to allow speciation.

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NEW SPECIES AND NEW COMBINATIONS IN BRASILIAN EUPATORIEAE (ASTERACEAE)

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ABSTRACT

A new combination is made for *Ageratum pohlii*, and the species *Austroeupatorium cordato-acuminatum, Campovassouria barbosae, Campuloclinium hatschbachii, Diacranthera hebeclinia, Heterocondylus macrocephalus, Praxelis splettii,* and *Trichogonia munhozii* are described as new.

KEY WORDS: Eupatorieae, Brazil, *Ageratum, Austroeupatorium, Campovassouria, Campuloclinium, Diacranthera, Heterocondylus, Praxelis, Trichogonia.*

One new combination and the following new species of Eupatorieae from Brazil have been put aside during identification efforts in the last 15 years.

Ageratum pohlii (Sch.Bip. ex Baker) H. Rob., **comb. nov.** Basionym: *Alomia pohlii* Sch.Bip. ex Baker, Fl. bras. 6(2): 190 (1873)

Austroeupatorium cordato-acuminatum H. Rob., **sp. nov.** TYPE: BRAZIL. Espirito Santo: Forno Grande (Mun. Castelo), arbusto ramoso, 1.50 m, capitulo alvo, paredőes rochosos, 18 May 1999, *G. Hatschbach, M. Hatschbach & J.M. Silva 69165* (holotype MBM, isotype US). (Fig. 1).

Ad Austroeupatoriam morii affinis sed ab tote speciebus congeneribus in laminis foliorum base cordatis et apice caudato-acuminatis differt.

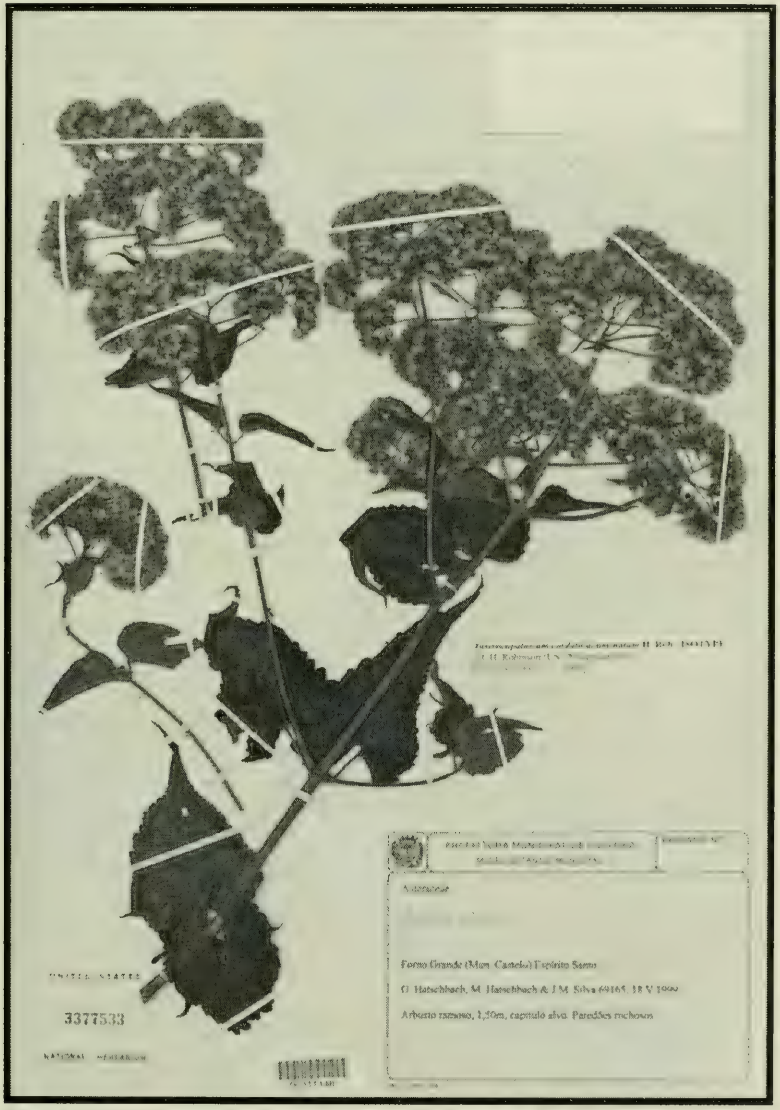
UNITED STATES
3377533
NATIONAL HERBARIUM
Forno Grande (Mun. Castelo) Espírito Santo
Arbusto ramoso, 1,50m, capítulo alvo. Paredões rochosos

Fig. 1. *Austroeupatorium cordato-acuminatum* H. Robinson, isotype, United States National Herbarium (US).

Subshrubs to 1.5 m tall, moderately branched; stems reddish brown, terete with slight ridges, sparsely hirsutulous; internodes to 9 cm long. Leaves opposite, petioles 0.5-1.5 cm long; blades ovate, 4-10 cm long, 1.5-5.5 cm wide, bases strongly cordate in stem leaves, subcordate in branch leaves, margins with 10-12 teeth, closer and larger above widest part of blade, smaller and remote distally, apex very narrowly and sometimes abruptly acuminate, upper surface densely pilose, lower surface densely hirsutulous, especially on veins; trinervate from basal sinus with pair of strongly ascending secondary veins that reach to distal 1/3. Inflorescences terminal on stems and branches, broad, dome-shaped, corymbiform; with many widely spreading branches, uppermost branches often at 90° angles, puberulous; peduncles 0-3 mm long. Heads ca. 5 mm high, 2-3 mm wide; involucral bracts brownish-yellow, subimbricate, ca. 15, in ca. 3 series, ovate to narrowly oblong, 1.5-4.5 mm long, 0.5-1.2 mm wide, acute to mostly obtuse at membranaceous tips, outside glabrous, with 2 or 4 ribs; receptacle glabrous. Florets mostly 6 in a head; corollas white, ca. 3.5 mm long, glabrous, basal tube ca. 1.3 mm long, strongly constricted above base of style, throat ca. 1.7 mm long, lobes ca. 0.3 mm long; anther collars ca. 0.2 mm long; thecae ca. 1 mm long; apical appendages oblong-ovate, ca. 0.25 mm long, 0.17 mm wide; style base hirsute with ascending hairs. Achenes ca. 2 mm long, with scattered glandular dots; carpopodium short and broad; pappus of ca. 30 capillary bristles, 2-3 mm long, tapering to tips, apical cells with blunt narrow tips. Pollen grains ca. 22 µm in diam.

Austroeupatorium cordato-acuminatum is known only from the type collection. The most distinctive features of the species are the strongly cordate base and strongly acuminate tip of the leaf blades. The closest relative might be *A. morii* R.M. King & H. Rob. of Bahia, but the latter has leaf blades with truncate bases, nearly hairless leaf surfaces, and 10-12 florets in the heads.

Campovassouria barbosae H. Rob., **sp. nov.** TYPE: BRAZIL. Paraná: Serra Capivari Grande (Mun. Campina Grande do Sul), arbusto 1.50 m, capitulo lilás, alto do morro, 23 Oct 2001, *E. Barbosa, O.S. Ribas & E.F. Costa 672* (holotype MBM, isotype US). (Fig. 2).

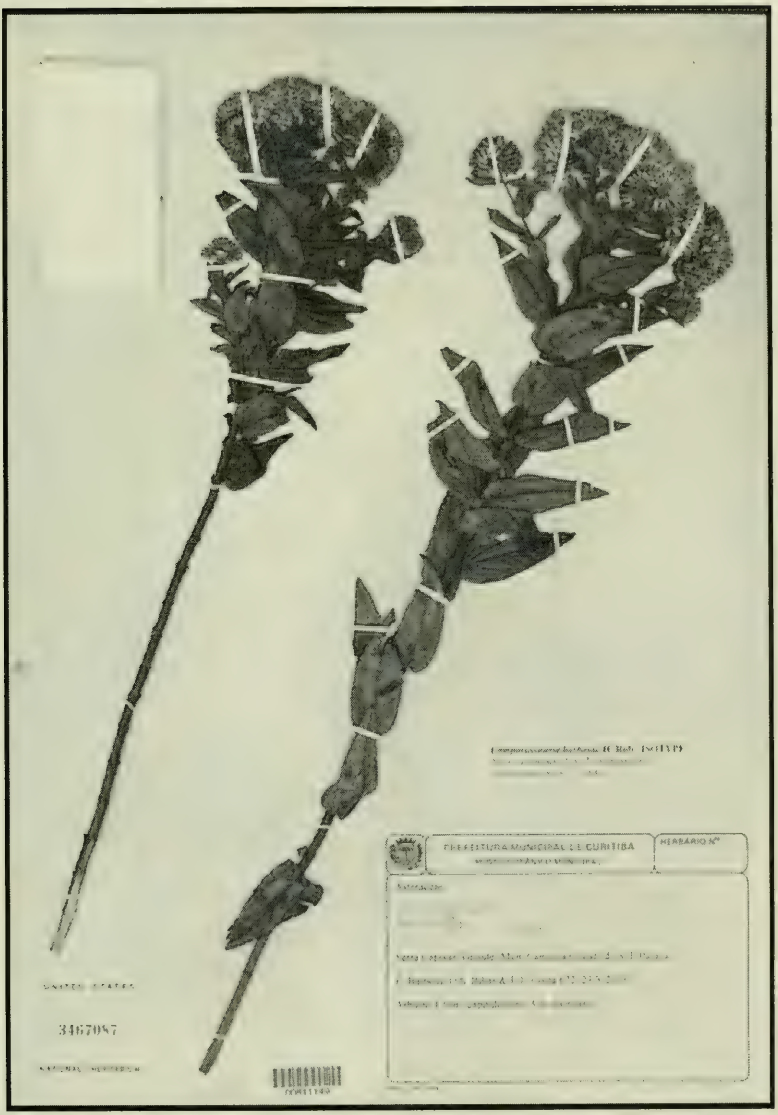

Fig. 2. *Campovassouria barbosae* H. Robinson, isotype, United States National Herbarium (US).

Ad Campovassouriam cruciatam valde affinis sed in foliis oblongo-ovatis in areolis aliquantum isodiametricis distincta.

Subshrubs or shrubs to 1.5 m tall, with branching at base? or in inflorescence; stems straight, yellowish brown, subhexagonal, ribbed when dry, densely hispid. Leaves opposite, petioles stout, ca. 0.1 cm long; blades subcoriaceous, oblong-ovate, mostly 3.5-4.5 cm long, 1.5-1.9 cm wide, base narrowly subcordate, margins narrowly recurved, remotely crenulate, apex acute, upper surface glabrous except on slightly insculpate veins, shiny, lower surface dull pale green, densely hispid and with scattered small glandular dots on larger veins, smaller veins sparsely hispid, areoles mostly glabrous; venation somewhat 5-nerved with long, arching, ascending secondary veins from near base. Inflorescences terminal on leafy stems with lower branches from leaf axils, broadly corymbiform, with heads in dense clusters; branches spreading at ca. 45° angles, hispidulous to puberulous; peduncles 0.5-3.0 mm long. Heads cylindrical, ca. 5 mm high, 1.5 mm wide; involucral bracts greenish to reddish, subimbricate, ca. 12, in ca. 4 very unequal series, mostly rather oblong, 1.5-4.5 mm long, 0.8-1.0 mm wide, apices rounded and membranaceous, outside glabrous, 3-furrowed. Florets 5 in a head; corollas white, narrowly funnelform, ca. 3.5 mm long, glabrous, basal tube ca. 1.3 mm long, throat ca. 1.5 mm long, lobes ca. 0.7 mm long; anther collars 0.25 mm long; thecae reddish, ca. 1 mm long; apical appendage ca. 0.23 mm long, 0.2 mm wide. Achenes ca. 2 mm long, glabrous, with poorly differentiated carpopodium, walls with transversely aligned internal punctations; pappus white to partially reddish, of ca. 30 scabrid bristles to 3 mm long, tapered to slender tips. Pollen grains ca. 25 μm in diam.

Campovassouria barbosae is known only from the type collection. The broad leaves with more or less isodiametric areoles contrast strongly with other material of the genus. The narrowly subauriculate bases of the leaf blades are matched in material of *C. cruciata* (Vell.) R.M. King & H. Rob., although this is not usually obvious. There remains some question as to whether the strongly decussate/cruciate-leaved material of typical *C. cruciata* should be specifically distinct from or include the more common narrow-leaved and mostly alternate-leaved form that has been known as *C. bupleurifolia* (DC.) R.M. King & H. Rob.

Campuloclinium hatschbachii H. Rob., **sp. nov.** TYPE: BRAZIL. Minas Gerais: Serra do Cabral, Armazén da Laje (Mun. Joaquim Pelício), Ereta, capítulos rosados, Campo rupestre, solo arenoso, 16 Mar 1997, *G. Hatschbach, M. Hatschbach & E. Barbosa 66355* (holotype MBM, isotype US). (Fig. 3).

A Campuloclinium irwinii in receptaculis conicus et in basis stylorum glabris simila sed in habitis minimis ephemeris et in corollis roseis differt.

Annual herbs to 40 cm tall; unbranched except sometimes in inflorescence; stems reddish-green, terete, faintly striated, hirsutulous; internodes 0.5-1.0 cm long near base, to 7 cm long above; root apparently simple, slender. Leaves opposite, sessile, very small nearest base, largest and most crowded above base, reduced and like bracteoles above basal 1/3, largest leaves oblong elliptical, 1.5-2.0 cm long, to 0.5 cm wide, base cuneate, margins serrulate with up to 12 blunt teeth, apex short-acute, surfaces pilose and densely gland-dotted; trinervate with hirsutulous midrib and strongly ascending secondary veins from base. Inflorescences with 1-3 heads, terminal on long upper internodes of plant, peduncles 0.8-4.8 cm long, hispidulous and gland-dotted. Heads 8-9 mm high, 6-9 mm wide; involucral bracts subequal, 15-18, in ca. 2 series, mostly green often with reddish margins, sometimes slightly yellowish on gibbous base, obovate, 4.5-5.5 mm long, 1.8-2.0 mm wide, short-acute, outside pilosulous and densely gland-dotted; receptacle conical, glabrous, non-alveolate. Florets 30-60 in a head; corollas reddish, narrowly funnelform, ca. 3.5 mm long, with scattered glandular dots outside, basal tube ca. 1 mm long, throat ca. 1.5 mm long, lobes 0.5-0.7 mm long; anther collars ca. 0.3 mm long; thecae ca. 1 mm long; apical appendage ca. 0.15 mm long, 0.2 mm wide; style base without hairs. Achenes ca. 3.5 mm long, with persistently pale setulose ribs, short-stipitate at base, with broadened annular carpopodium; pappus white, of ca. 22 capillary bristles 2.0-2.5 mm long. Pollen grains ca. 20µm in diam.

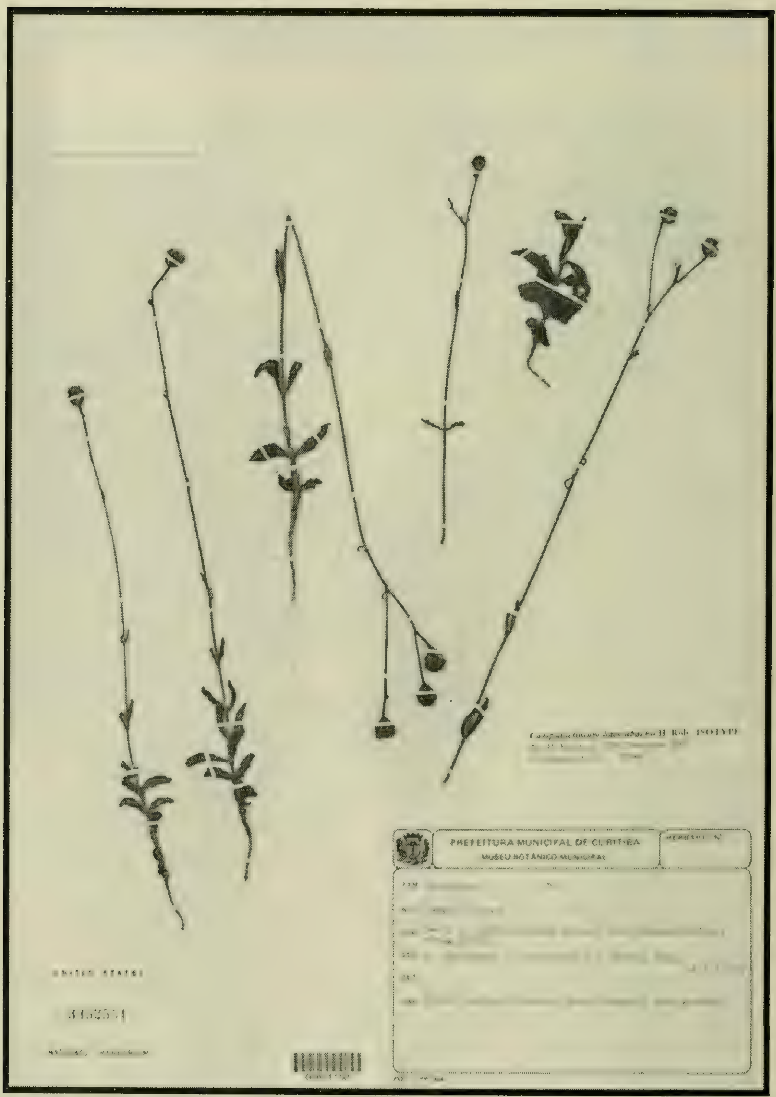

Fig. 3. *Campuloclinium hatschbachii* H. Robinson, isotype, United States National Herbarium (US).

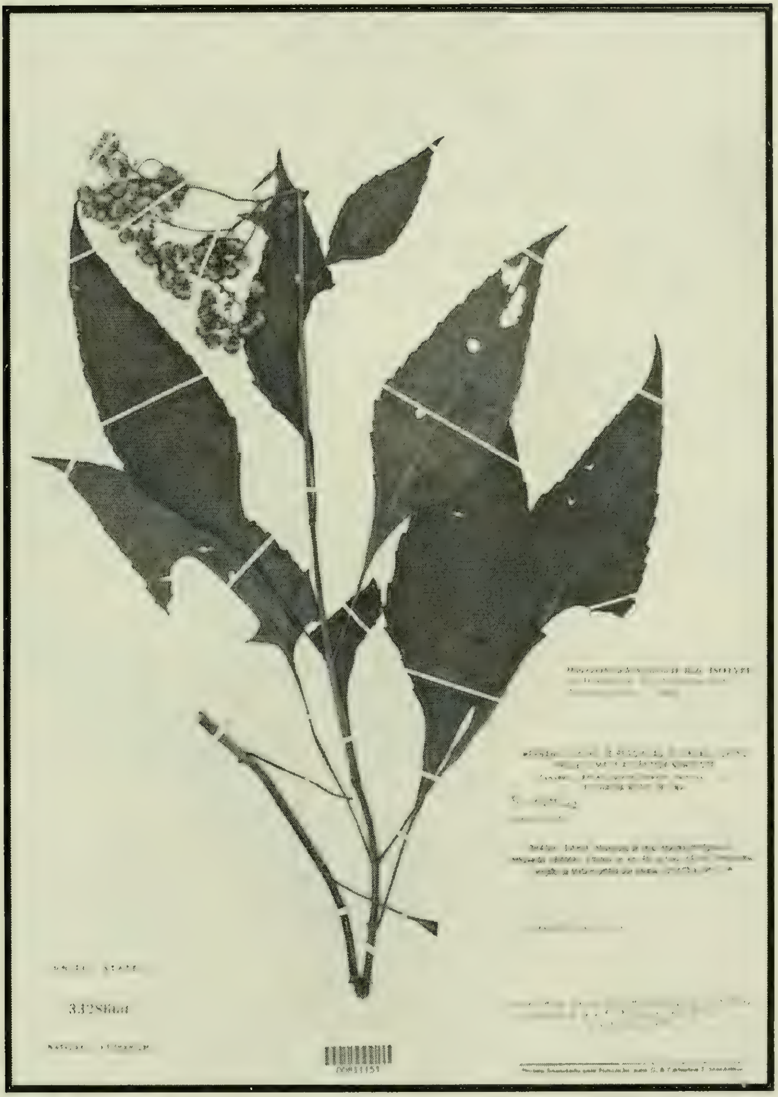

Fig. 4. *Diacranthera hebeclinia* H. Robinson, isotype, United States National Herbarium (US).

Campuloclinium hatschbachii is known only from the type collection. The species is evidently a smaller, more ephemeral relative of *C. irwinii* R.M. King & H. Rob. The latter shares the hairless base of the style and the more conical receptacle, but it is cited as a perennial, and has larger leaves and more numerous heads with white corollas. The latter species also has much more extensive yellow coloration on the bases of the involucral bracts.

Diacranthera hebeclinia H. Rob., **sp. nov.** TYPE: BRAZIL. Bahia: Municipio de Una, Reserva Biológica do Mico-leão (IBAMA), Eńtrada no km 46 da Rod. BA-001 Ilhéus/Una, Região da Mata Higrófila Sul Baiana, 15°09'S 39°05'W, inflorescências alvas, 13 Sept 1995, *A.M. de Carvalho, A.M. Amorim, S.C. Sant'Ana, J.G. Jardim & G.V.F. Pitanga 6125* (holotype CEPEC, isotypes NY, US). (Fig. 4).

A Diacrantheram resinosam affinis sed in caulibus fere glabris in foliis longioribus acuminatis non glandulo-punctatis in bracteis involucri apice brevioribus et in receptaculis pilosis distincta.

Herbs to 1 m tall, sparsely branched; stems pale brownish, terete, rather smooth, glabrous; internodes 2.5-5.5 cm long, with solid pith. Leaves opposite below, alternate distally, petioles slender, 2.5-4.5 cm long; blades membranaceous, ovate-lanceolate, 7-15 cm long, 2.5-6.0 cm wide, base narrowly long-acuminate, grading into petiole, margins with 6-12 serrations mostly beyond widest part, apex narrowly short-acuminate, surfaces nearly glabrous, with sparse, very minute puberulence, no glandular dots, lower surface slightly paler; triplinervate with pair of stronger secondary veins from 1.0-3.5 cm above base of blade, spreading at ca. 35° angles, slightly arching. Inflorescence terminal, shallowly cymiform with heads in rather dense clusters, branching alternate to subopposite; peduncles (0.5-)4.0-8.0 mm long, puberulous. Heads 6-7 mm high, ca. 5 mm wide; involucral bracts weakly subimbricate, 20-25, in ca. 4 series, a few at base very narrow, ca. 1.0-1.5 mm long, most bracts yellowish, rather membranaceous, ovate to elliptical or obovate, 2.5-4.0 mm long, 0.7-1.3 mm wide, acute, glabrous or very sparsely, minutely puberulous outside, striate with many veins; receptacle convex, nearly conical, with many fine hairs on ridges. Florets ca. 35 in a head; corollas white, 3.5 mm long, funnelform from cylindrical base, mostly glabrous, basal tube ca. 1.5 mm long, throat ca. 2 mm long, lobes ca. 0.5 mm long, with glandular dots outside, broad isodiametric cells inside; anther collar ca. 0.2 mm long; thecae reddish, ca. 0.8 mm long; apical appendage ca. 0.1 mm long, bilobed; style base with hirsute node. Achenes ca. 2 mm long, glabrous, carpopodium with few short thin-walled cells at base, with longer thin-walled cells procurrent on bases of achene ribs; pappus of 25-27 white capillary bristles, not broadened at tips. Pollen grains ca. 25 μm in diam.

Diacranthera hebeclinia is named after the numerous short hairs on the receptacle. A review of specimens has shown that *D. resinosus* (Spreng.) R.M. King & H. Rob. and its closely related northern relative *D. ulei* R.M. King & H. Rob. have some scarcely noticeable hairs on the receptacle, but usually appear hairless. The new species, is thoroughly distinct in other features such as the nearly glabrous stems, the nearly glabrous leaves with no evident glandular dots, the acuminate tips of the leaves, and the blunter tips of the essentially glabrous involucral bracts.

Heterocondylus macrocephalus H. Rob., **sp. nov.** TYPE: BRAZIL. Minas Gerais: Pico do Inficionado, Serra do Caraça, Catas Altas, 2050 m, 2 Sep 1999, *M.F. Vasconcelos s.n.* (holotype BHCB, isotype US). (Fig. 5).

A Heterocondylam pandurifoliam et H. decipiens in habitis herbaceis et folia oppositis simila sed in laminis folii latis basi valde petioliformibus et in bracteis involucri exterioribus brevibus distaliter recurvatis interiore et exteriore glanduliferis et in floribus 50-60+ in capitulis distincta.

Herbs 0.5 m tall? with few branches; stems terete, densely covered with spreading stipitate glands; internodes below inflorescence 0.8-1.0 cm long. Leaves opposite, petioliform bases 0.5-1.0 cm long, distnctly winged to base, wings nearly meeting across node; blade ovate, 2-5 cm long, 1.2-3.0 cm wide, abruptly broadened at base, margins with 7-17 blunt serrulations, apex short-acute, upper surface dark green, evenly

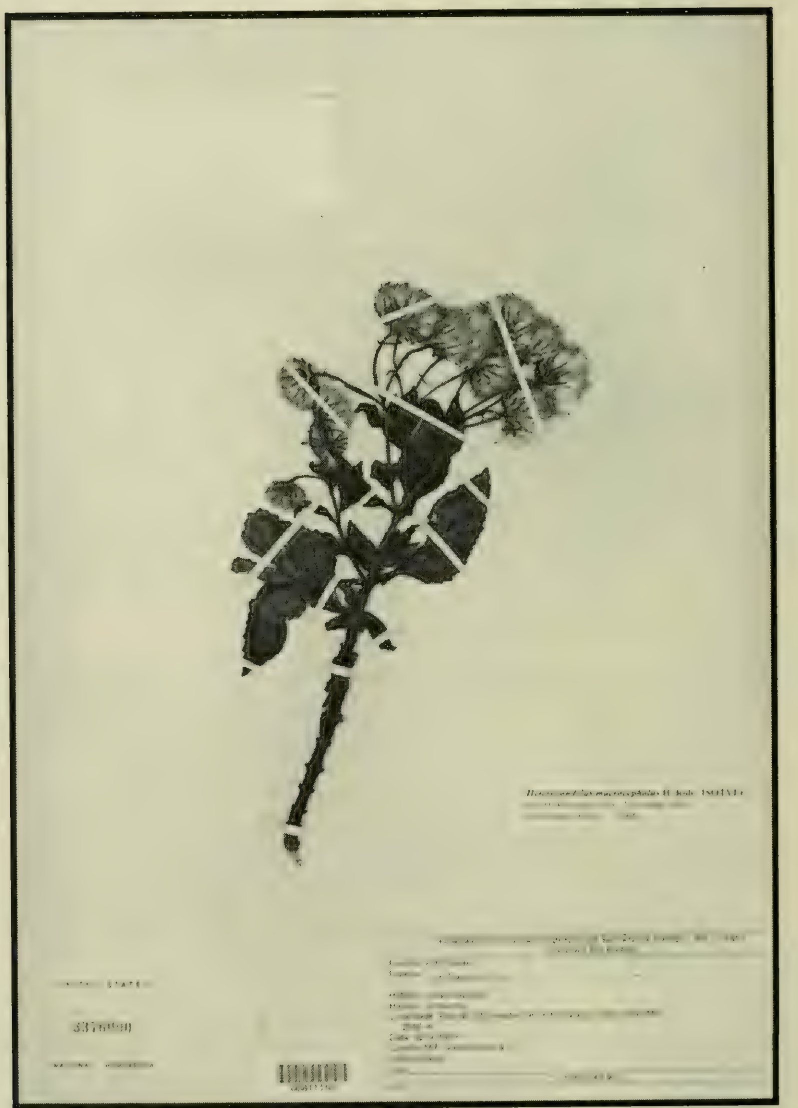

Fig. 5. *Heterocondylus macrocephalus* H. Robinson, isotype, United States National Herbarium (US).

hirtellous with gland-tipped hairs, lower surface paler green, hirtellous with gland-tipped hairs, denser and longer on veins, trinervate with ascending secondary veins from 1-4 mm above level of blade expansion. Inflorescence terminal and from upper axils, corymbiform, with reduced opposite leaves proximally, with minute, linear, alternate bracteoles above; peduncles 1.5-3.5 cm long, in groups of 3, densely hirtellous to hirsute with stipitate glands. Heads broadly campanulate, 15-18 mm high, 18-20 mm wide; involucral bracts subimbricate, ca. 40, in ca. 4 unequal series with outer bracts more herbaceous, bracts lanceolate, 4-12 mm long, 0.5-1.5 mm wide, tips very narrowly acute to attenuate, margins and outer surface with many gland-tipped hairs, tips of outer bracts often recurved with glands on both surfaces. Florets 50-60 or more in a head; corollas creamy-white, glabrous, ca. 8 mm long, basal tube 2.5 mm long, not or slightly constricted above base, throat ca. 4.5 mm long, lobes oblong-ovate, ca. 1.2 mm long; anther collars ca. 0.4 mm long, with densely annulate thickenings on cell walls; thecae ca. 2.3 mm long; apical appendages oblong-ovate, ca. 0.6 mm long, 0.32 mm wide; style base abruptly enlarged, glabrous. Achenes ca. 5 mm long, fusiform, with mostly sparse, short, stipitate glands on ribs and sides, with tapering, somewhat asymmetric basal stipe; carpopodium asymmetric with many rows of quadrate cells; pappus of ca. 18 white, capillary bristles in 1 series, ca. 6 mm long, not broadened distally. Pollen grains 25-27 µm in diam.

Heterocondylus macrocephalus is known only from the type. The species belongs to a group in the genus including *H. amphidyctius* (DC.) R.M. King & H. Rob., *H. decipiens* (Baker) R.M. King & H. Rob., *H. pandurifolius* (DC.) R.M. King & H. Rob. and the perhaps too close relative of *H. amphidyctius, H. pumilus* (Gardn.) R.M. King & H. Rob. Of these relatives, most have less abruptly petioliform bases on the leaves, less pubescent leaves, and fewer florets in the heads. *Heterocondylus amphidyctius* seems to differ further by more slender bases on the corollas and setulae on the achenes. It is the least well-known *H. decipiens* that seems closest in shape and pubescence of the upper leaf blade, pubescence outside of the involucral bracts, and the size of the head, described with 50 florets? However, type photographs of the latter show a much more slender plant with cuneate rather than petioliform bases on the leaves, and the involucral bracts are described as 15-20 and subequal. In the new species, the outer involucral bracts have recurved tips covered with glandular hairs on both sides, a form that seems unique in the species group.

Exact relationship to the recently described *Heterocondylus inesiae* Esteves & Goncalves –Esteves of São Paulo (2004) is not yet known.

Praxelis splettii H. Rob., **sp. nov.** TYPE: BRAZIL. Goias: Flora do Cerrado, Campos de Areias Quartzosas, GO 118, 15.5 km ao norte de Alto Paraiso, 13°46'S 47°30'O, ca. 1100 m, erva ca. 0.15 m, flores lilas-vermelhas, crescendo em solo arenoso, úmido, no local multo frequente, 29 May 1994, *Splett 271* (holotype UB, isotypes BONN, US). (Fig. 6).

A Praxelem capillarem in foliis linearibus et in corollis aliquantum asymmetricis similis sed in foliis plerumque alternis non pseudoverticillatis in setis pappi ca. 10 et in pollinis fertilibus distinctis.

Erect herbs to 0.15 m tall, with few or no leafy branches; stems green to red-tinged, hexagonal to pentagonal, glabrous with few glandular dots. Leaves mostly alternate, opposite near base, sessile, linear, mostly 0.5-1.2 cm long, ca. 0.07-0.10 cm wide, glabrous above, with numerous glandular dots below, with only a median vein evident. Inflorescence diffuse, with single heads on tips of branches or on long peduncles from upper axils; peduncles 2-5 cm long, with few minute foliiform bracteoles. Heads 9-10 mm high, 2-3 mm wide, cylindrical; involucral bracts reddish, imbricate and appressed, all deciduous, ca. 16, in ca. 5 unequal series, elliptical, 1.5-7.0 mm long, 0.5-1.5 mm wide, often with apical mucro, margins narrowly scarious, glabrous outside with 3 dark lines; receptacle conical, glabrous. Florets ca. 15 in a head; corollas reddish-purple, 6.5-7.0 long, basal tube ca. 1 mm long, throat ca. 2 mm long, lobes more asymmetric in peripheral florets, with outer lobes to 3 mm long, inner lobes 1.0-1.5 mm long, lobes with glandular dots outside, densely papillose inside; anther collars ca. 0.25 mm long, not enlarged at base; thecae ca. 1.2 mm long; apical appendage ovate, ca. 0.25 mm long, 0.17 mm wide, with crenulate-

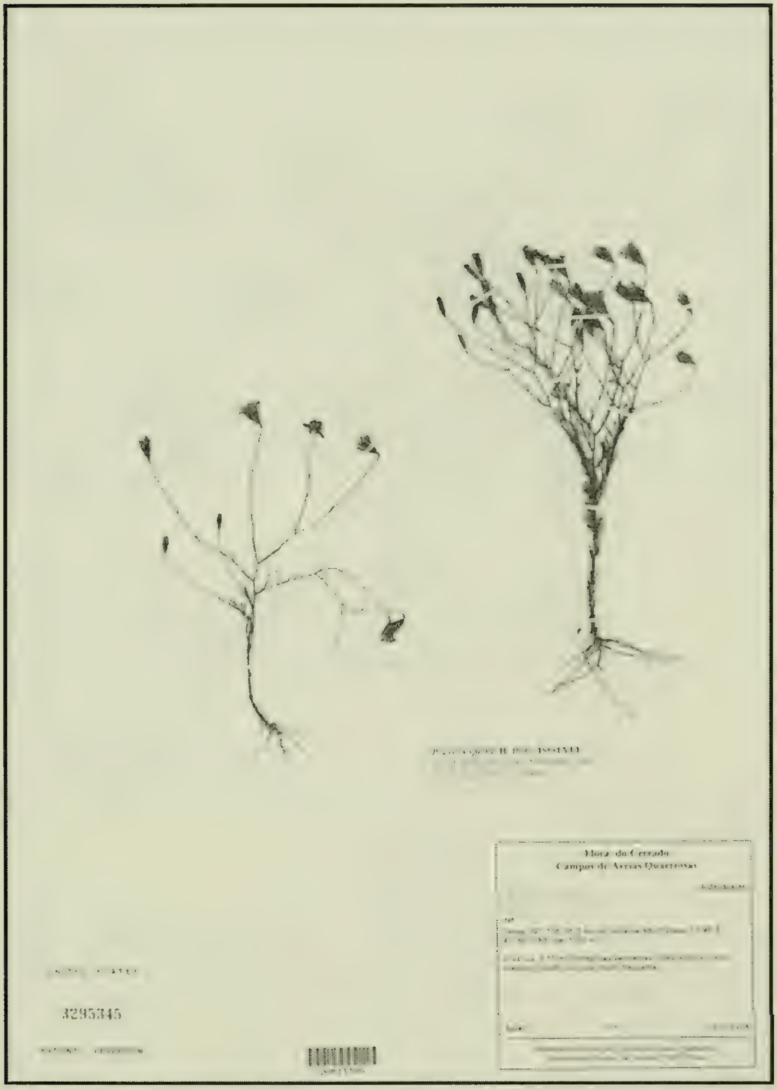

Fig. 6. *Praxelis splettii* H. Robinson, isotype, United States National Herbarium (US).

serrulate edge; style base plain. Achenes immature, ca. 2 mm long, 3-angled, densely setuliferous on ridges with soft hairs; pappus of ca. 10 whitish bristles, 2-4 mm long, tapering to tips. Pollen grains ca. 18 μm in diam.

Praxelis splettii is reminiscent of *Eitenia* R.M. King & H. Rob. in habit and in the asymmetric corollas, but the leaves are linear, not ovate, the heads are cylindrical, the achenes have 3-ridges, and the pappus does not have 5 distinct stout bristles. The pappus bristles vary in size, but are not abruptly differentiated between large and small. Closer relation is evidently to *Praxelis capillaris* (DC.) Sch.Bip., which also tends to have asymmetric corollas, but the latter has narrower filiform leaves in pseudoverticils, involucres not reddish, pappus bristles ca. 15 and more equal in size, and non-functional pollen. In the same related group is *P. riedelii* Sch.Bip., with opposite leaves with narrow but distinct laminae and lobes, non-asymmetric corollas, and functional pollen.

Trichogonia munhozii H. Rob., **sp. nov.** TYPE: BRAZIL. Goias: Alto Paraíso, rod. Para Colinas do Sul, Rio das Cobras, 14 June 1993, sublenhosa, 1 m, capítulos alvos, campo rupestre, solo rochoso, *G. & M. Hatschbach 59528 & E. Barbosa* (holotype MBM, isotype US). (Fig. 7).

A Trichogoniam dubiam et T. laxam in caulis breviter stipitato-glanduliferis in foliis bullatis et in capitulis ca. 60-floribus valde affinis sed in capitula brevioribus in achenia setuliferis et in pappis brevibus distincta.

Erect to reclining subshrub to 1 m tall, with many ascending branches; stems terete, densely felted with short stipitate glands, often with intermixed non-glandular hairs. Leaves alternate, petioles 0.2-0.8 cm long, grading into blade; blade rather oblanceolate, mostly 2.5-7.0 cm long, 0.5-1.7 cm wide, base narrowly cuneate, margins crenulate, apex short-acute, upper surface bullate with insculpate veins, densely antrorsely puberulous, lower surface with strongly exscupate veins, densely hispidulous, with many glandular dots; venation pinnate with

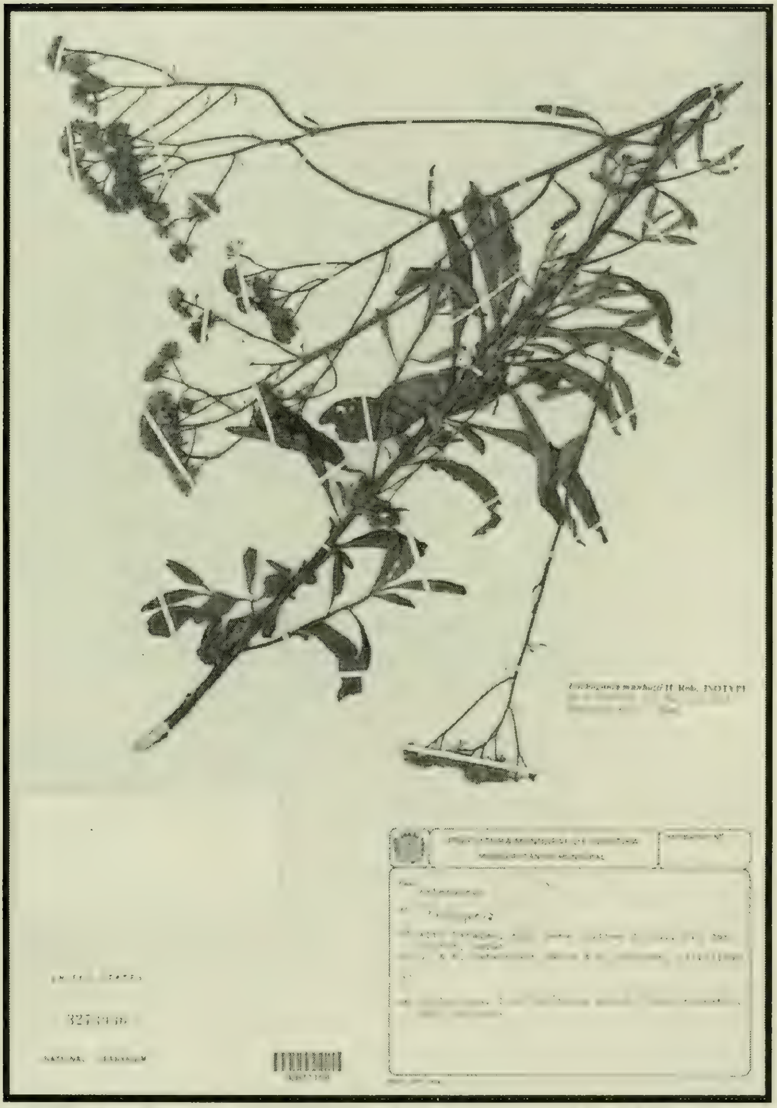

Fig. 7. *Trichogonia munhozii* H. Robinson, isotype, United States National Herbarium (US).

strongly ascending secondary veins. Inflorescences broad flat-topped cymes, branches ascending, densely felted with short stipitate glands; peduncles 2-10 mm long. Heads broadly campanulate, 5-7 mm high; involucral bracts eximbricate, 25-30, in 2 series, narrowly oblong elliptical to oblanceolate, ca. 5 mm long, 1 mm wide, apices narrowly acute, densely puberulous and with some glandular dots outside; florets 60-70 in a head; corollas white, very thin-walled, 3.0-3.5 mm long, densely covered with minute stipitate glands below, with numerous longer non-glandular hairs on upper throat and lobes, basal tube cylindrical, ca. 1 mm long, throat funnelform, 1.5-2.0 mm long, lobes ca. 0.5 mm long; anther collars ca. 0.4 mm long; thecae pale reddish, ca. 0.9 mm long; apical appendages oblong-ovate, ca. 0.1 mm long, 0.1 mm wide; style branches not or scarcely broadened at tips. Achenes 2.5-3.0 mm long, with scarcely stipitate base, setulae are dense along the ribs and scattered on the upper surfaces between the ribs; pappus bristles ca. 20, non-contiguous, 0.5-1.0 mm long, densely short-plumose. Pollen grains ca. 22 μm in diam.

PARATYPE: BRAZIL. Distrito Federal: Fazenda Agua Limpa, divisa com o Cristo Redemor (Jardim Botânico de Brasília) e o IBGE, na mata de galeria do córrego Taquara, campo sujo rupestre úmido, 15°55'478"S 47°54'225"O, 22 Apr 2000, *C. Munhoz, N. Rodrígues & K.M.O. Ramos 1158* (holotype BHCB, isotype US).

Trichogonia munhozii was identified first from the Munhoz specimen from the Jardim Botânico de Brasilia, although the much more ample Hatschbach collection is here selected as the type.

The species belongs to that group in the genus with glanduliferous corolla tubes, and is one within that group with 60 or more florets in the heads. The two most closely related species, *Trichogonia dubia* (B.L. Rob.) R.M. King & H. Rob. and *T. laxa* Gardn. have the same kind of bullate, crenulate, cuneate-based leaf blades. However, both have somewhat larger heads, often 8 to 10 mm high. The first, *T. dubia* has no pappus and no setulae or glands on the achene, but *T. laxa* has long and fully plumose pappus bristles and sparse, spreading, minute, slender stipitate glands on the achene. The epappose non-setuliferous achenes of *T. dubia* may represent a calvous-achened form of *T. laxa*, which it otherwise resembles, but *T. munhozii* has smaller heads with shorter florets and achenes.

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NEW SPECIES OF *AGERATINA* FROM ANDEAN SOUTH AMERICA (EUPATORIEAE: ASTERACEAE)

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ABSTRACT

Five species of *Ageratina* from Colombia, *A. fleischmannioides, A. killipii, A. rangelii, A. persetosa,* and *A. trianae;* one from Peru, *A. dillonii*; and two from Bolivia, *A. acevedoi* and *A. feuereri* are described as new.

KEY WORDS: *Ageratina,* Eupatorieae, Colombia, Peru, Bolivia.

The genus *Ageratina* Spach was resurrected by King and Robinson in 1970 for a series of over 200 species that had long been placed in *Eupatorium* L. Additions have continued to be made to the genus, especially by King and Robinson 1990, Turner (as summarized in 1997), and Robinson (2003). New species have continued to be discovered, as noted below, sometimes as a result of clarification of older concepts.

A new review of specimens put aside during identification work has led to the recognition of many new species of *Ageratina* here separated out for description. Of these, the first is an unusual species from Sierra Nevada de Santa Marta in northern Colombia that proves closely related to *A. flaviseta* (B.L. Rob.) R.M. King & H. Rob. of the same mountain. The study of the latter species led to a reinvestigation of the specimens in the herbarium under the name *Ageratina flaviseta*, resulting in the description of two additional new species. Material from Colombia erroneously placed under the name *A. fastigiata* has also been examined and described as new. A fifth new species from Colombia is from the Pacific slope area. In habit it resembles some species of *Fleischmannia* from that area. The new Peruvian species is one of a group in the northern part of that country notable for the tomentose undersurfaces of the leaves, and the material had been erroneously identified as *A. chachapoyensis* (Cuatrec.) R.M. King & H. Rob. The two new species from Bolivia are both notable for the small size of their heads and florets.

The new species are as follows with their subgeneric placements indicated.

Ageratina** (Andinia)* ***persetosa H. Rob., **sp. nov.** TYPE: COLOMBIA. César (as Magdalena): Sierra Nevada de Santa Marta, entre Duriaimena y San Sebastián, alt. 3300-3450 m, 10 Dec 1978, *O. Rangel, H. Sturn & E. Wedler1938* (holotype NY; isotype COL). (Fig. 1).

Ad Ageratina flaviseta valde affinis sed in laminis foliorum tote dense pilosis et in bracteis involucri longe acutis vel acuminatis distincta.

Small shrubs 0.5-1.0 m tall, rather densely branched; stems terete, densely covered with stout, erect-patent, yellowish, antrorse setae ca. 2 mm long; internodes 0.9-2.5 cm long. Leaves opposite, with petioles 0.5-1.0 cm long, densely covered with yellowish setae; blades elliptical, 2.2-4.3 cm long, 1.4-2.2 cm wide, base obtuse, margins with 6-10 blunt serrations, apex short-acute, both surfaces with dense yellowish antrorse setae, not completely obscuring surface except on midvein below, veins exsulcate, more so below, usually pinnate with 4-8 widely spreading secondary veins in each half, 1 vein often more ascending and appearing triplinervate, veinlets closely prominulous, without glandular dots. Inflorescence corymbiform, in dense clusters ca. 3 cm high and 5 cm wide, terminal on leafy branches with subtending internodes not elongate and subtending leaves only moderately reduced; peduncles 1-5 mm long, densely setiferous with yellow hairs; heads narrowly campanulate, ca. 11 mm high, 5-6 mm wide before drying; involucral bracts ca. 13, eximbricate, in ca. 2 series, narrowly lanceolate, mostly 7-8 mm long, with slender often reddish tips, triplinerved and setiferous outside, sparse on inner bracts. Receptacle glabrous. Florets 13-15; corollas red-purple, narrowly funnelform, ca. 6 mm long, glabrous outside except for few small hairs on backs of some lobes, basal tube ca. 2 mm long, throat ca. 3 mm

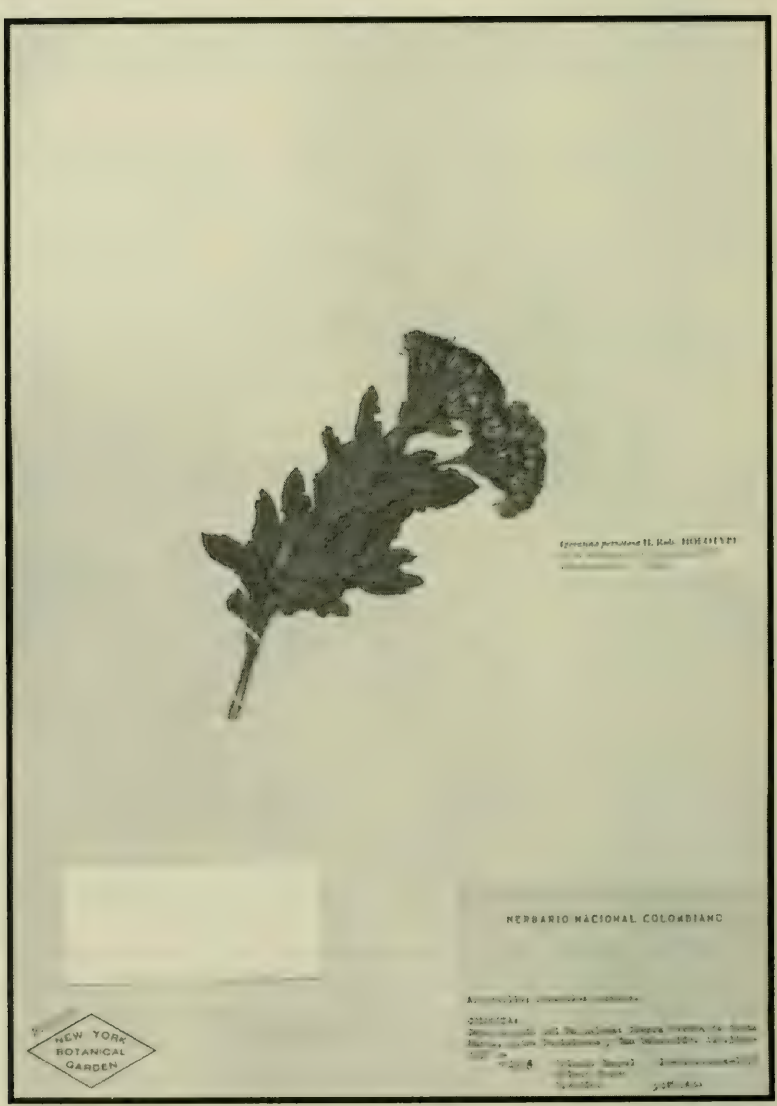

Fig. 1. *Ageratina persetosa* H. Robinson, holotype, New York Botanical Garden (NY).

long, lobes ca. 1 mm long, with nearly smooth outer surface, slightly roughened at tip. Densely papillose inside; anther collar ca. 0.4 mm long, cell walls scarcely ornamented; anther thecae pale, ca. 1.5 mm long, apical appendage ovate-oblong, ca. 0.35 mm long, 0.25 mm wide; style base without enlarged node. Achenes ca. 3 mm long, with minute glands on ribs and upper surfaces, a few setulae near pappus; carpopodium annuliform; pappus bristles ca. 35, 5-6 mm long, scarcely narrowed below. Pollen grains ca. 25 μm in diameter.

Ageratina persetosa is known only from the type and isotype. The label describes the plant as “arbustillo” without measurement, and describes the flowers as “morados”.

A basal stylar node is lacking in the type material, but that feature is probably not consistently lacking. As such, the species seems closely related to species of the subgenus *Andinia* that are numerous in the area of the Sierra Nevada de Santa Marta. This seems particularly true of *A. flaviseta* (B.L. Rob.) R.M. King & H. Rob. A scan of the type of that species, kindly provided by the herbarium at Kew, shows that species to be an almost immediate relative, differing primarily by the long hairs of the leaf blade being more restricted to the main veins of the undersurface, and the involucral bracts being broader and more shortly acute.

The study of the above new species led to a review of specimens previously placed under the name *Ageratina flaviseta* (B.L. Rob.) R.M. King & H. Rob. These are as follows.

Ageratina (Andinia) flaviseta (B.L. Rob.) R.M. King & H. Rob., Phytologia 19: 221. 1970.

Eupatorium flavisetum B.L. Rob., Proc. Amer. Acad. Sci. 54: 244. 1918.

B. L. Robinson (1918a) based the species on Funck no. 520, collected 1842-3, preserved at K, originally cited as “Venezuela &c.” Robinson (1928) cited a duplicate of the Funck collection at the

University of Geneva with more complete collection data specifying not Venezuela, but the Sierra Nevada de Santa Marta in Colombia.

Eupatorium flavisetum var. *asetosum* B.L. Rob., Contr. Gray Herb., n.s. 80: 20. 1928.

B. L. Robinson (1928) also described a new variety based on supposedly less setose plants. An isotype of the variety at US shows the veinlets of the lower leaf surface flattened and bearing glands on their flattened or "furrowed" tops, a feature not seen in the type of the species or in *A. persetosa* or any of the following species. The feature is characteristic of the more widely distributed *A. theaefolia* (Benth.) R.M. King & H. Rob. of Colombia and Venezuela and *A. glyptophlebia* (B.L. Rob.) R.M. King & H. Rob. of Colombia, and the variety is regarded here as as a synonym of the latter species.

Ageratina** (Andinia)* ***rangelii H. Rob., **sp. nov.** TYPE: COLOMBIA. César (as Magdalena): Sierra Nevada de Santa Marta, Vallecito de la Laguna "La Perdida" entre el Filo La Cumbre y La Cuchilla La Cimarrona, alt. 3350 m, Dec 1977, *O. Rangel Ch. 1370A* (holotype US, isotype COL). (Fig. 2).

Ad A. flavisetam superficialiter simila sed in setis vix patentiter et in foliis ovatis margine dense serrulatis distincta.

Shrubs to 1.2 m high, moderately branched; stems terete, rather sericeous with dense, slender, slightly flexuous, antrorse, yellow hairs; internodes mostly 0.6-1.2 cm long. Leaves opposite, petioles ca. 5 mm long, densely sericeous with yellow hairs to 1 mm long; blades ovate, mostly 3.5-6.0 cm long, 1.3-2.3 cm wide, base and apex short-acute, margins closely multi-serrulate, venation pinnate, with ca. 6 secondaries in each half, both surfaces resinous, veinlets closely reticulate, prominulous, not flattened or furrowed on surface, with slender, yellow, reclining, antrorse hairs mostly on midvein, some on secondaries and margin, and very sparse on lamina. Inflorescence terminal on leafy stems, closely subtended by moderately reduced leaves; peduncles 1-6 mm long, densely antrorsely setulose; heads ca. 12 mm high, involucre ca. 7 mm high and 4 mm wide, with ca. 14

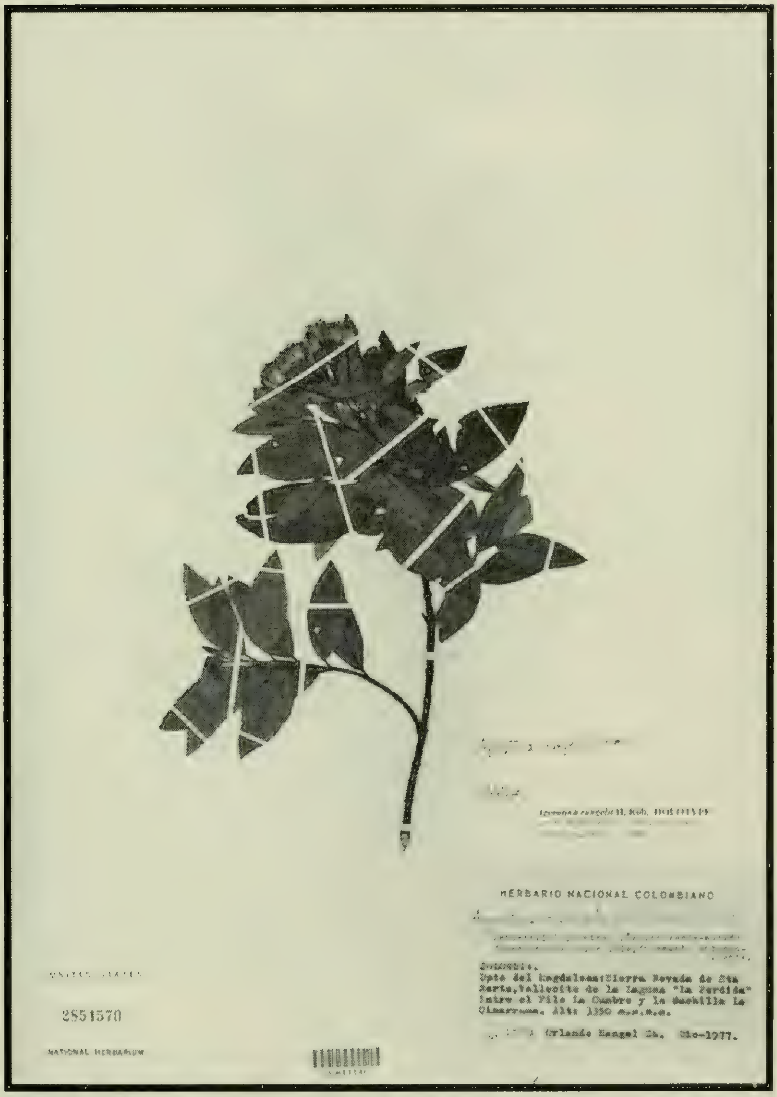

Fig. 2. *Ageratina rangelii* H. Robinson, holotype, United States National Herbarium (US).

eximbricate bracts in ca. 2 series; bracts lanceolate, mostly 5-6 mm long, to 1 mm wide, 1 or 2 smaller bracts outside, narrowly acute to a blunted tip, outer surface densely appressed-pilosulous; florets ca. 10-20 in a head; corollas lilac or red-violet, narrowly funnelform, ca. 6.5 mm long, basal tube ca. 2.5 mm, throat ca. 3 mm, lobes ca. 0.8 mm, nearly glabrous outside, backs of lobes smooth with few hairs, densely papillose inside; anther collars ca. 0.4 mm long, thecae pale, ca. 2 mm long; apical appendage broadly ovate-oblong, ca. 0.35 mm long, 0.27 mm wide; style base slightly enlarged. Achenes ca. 4 mm long, with many minute glands, short setulae on ribs; carpopodium annuliform; pappus of ca. 35 capillary bristles, ca. 6 mm long, often reddish, usually slightly broader and more scabrid distally. Pollen grains ca. 27 µm in diam.

PARATYPE: COLOMBIA. César (as Magdalena): Sierra Nevada de Santa Marta, alrededores de cabaceras de Río Seville, ca. 3490 m, 20 Jan 1959; *H.G. Barclay & P. Juajibioy 6571* (COL, US). Attached comments are, "shrub to 1.5 m tall. Leaves lighter below, to 6 x 2 cm. Heads purple; involucre green below, streaked with purple above; disc flowers red-violet, lighter where spreading; stigmas deeper purple." Habitat cited, "in large, deep draw bounded by rock outcrops; with trees and shrubs; glassy below and above, west-facing slope above campsite, on south side of river. Sta. 5".

The specimens were determined as *Ageratina flaviseta* initially because of the locality of Santa Marta and yellowish hairs concentrated on the midrib of the leaf. The original description also agreed in the lanceolate and pubescent involucral bracts. The description differed, however, in stating the hairs to be patent, and in measurements of the head and the count of the pappus bristles. The latter characters were perhaps incorrect, but the shape of the leaves in the type of *A. flaviseta* was totally different, elliptical with a few remote, blunt teeth.

Ageratina** (Andinia)* ***killipii H. Rob., **sp. nov.** TYPE: COLOMBIA. Norte de Santander: Cordillera Oriental; road from Pamplona to Toledo, crossing the divide between Río La Teja (Maracaibo drainage) and Río Masme (Orinoco drainage), 2800-3000 m; dense

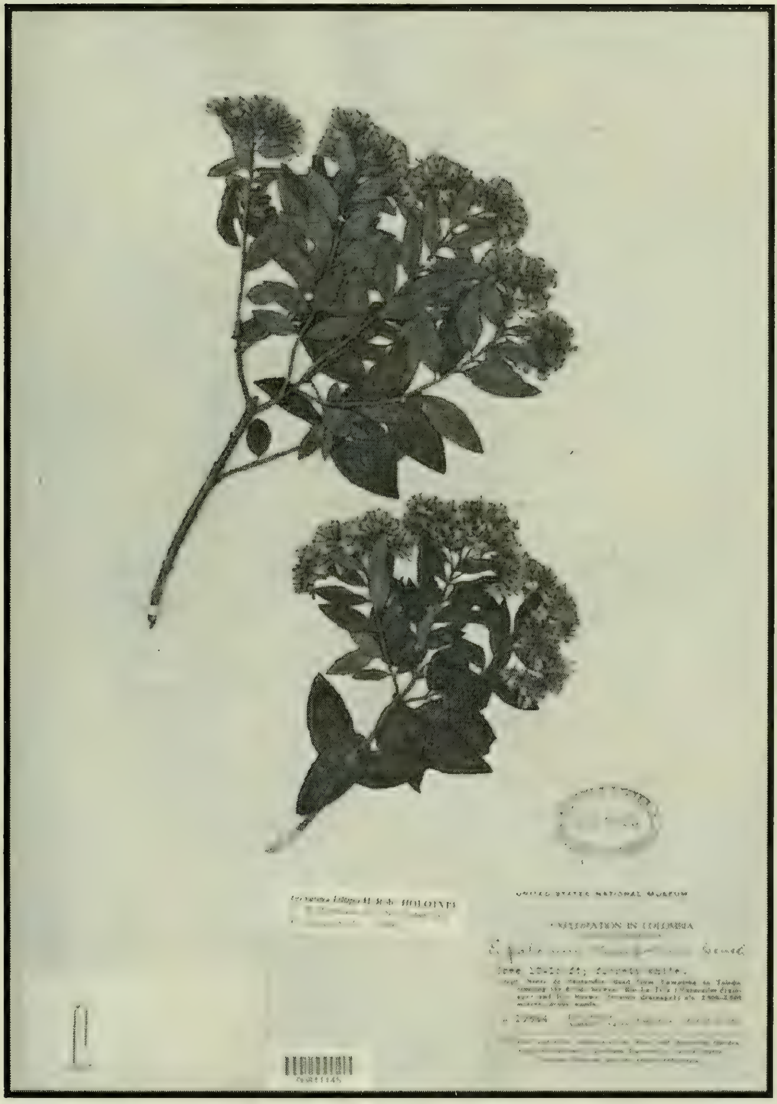

Fig. 3. *Ageratina killipii* H. Robinson, holotype, United States National Herbarium (US).

woods; 27-28 Feb 1927; *E.P. Killip & A.C. Smith 19844* (holotype US, isotypes GH, NY). (Fig. 3).

Ad A. rangelii similis sed in pilis cauli patentibus in floribus 5 vel 6 in capitulo et in bracteae involucri oblongis et extus glabris differt.

Shrubs or trees to 5 m tall, moderately branched; stems pale to brownish, terete, short-hirsute with stiff, spreading hairs, becoming glabous below; internodes 0.5-2.5 cm long. Leaves opposite, petioles 0.2-0.3 cm long, essentially glabrous; blade ovate to oblong-ovate, 2.5-6.0 cm long, 1-3 cm wide, base obtuse to somewhat rounded, margins minutely serrulate with ca. 10 small, blunt teeth, apex short-acute, venation subpinnate with 1 or 2 lower secondaries more ascending to triplinervate, surfaces shiny, nearly glabrous with very sparse erect hairs, lower surface paler, without obvious glands, veinlets in close prominulous reticulum, veins not flattened or furrowed. Inflorescence broadly corymbiform, terminal on leafy branches, without elongated internodes; clusters to 9 cm wide, whole inflorescence rarely to 27 cm wide; peduncles 0.1-4.0 mm long, hirtellous with yellow hairs. Heads 7-8 mm high; involucres 4-5 mm high, 2-3 mm wide, weakly subimbricate; bracts ca. 10, in ca. 3 series, oblong or oblong-elliptic, 1.5-4.5 mm long, 0.4-1.3 mm wide, weakly bicostate, membranaceous distally, apex rounded with fringe of small hairs, outer surface glabrous. Florets 5 or 6 in a head; corollas white to pink, narrowly funnelform, 6.0-6.5 mm long, glabrous outside, basal tube 2 mm long, throat 3 mm long, lobes ca. 1 mm long, smooth outside, densely papillose inside; anther collars ca. 0.35 mm long, thecae reddish, 1.7 mm long; apical appendages oblong-ovate, ca. 0.35 mm long, 0.26 mm wide; style base enlarged. Achenes 3.2-3.5 mm long, glabrous; carpopodium short, stopper-shaped; pappus mostly 4.0-4.5 mm long, of ca. 32 slender bristles in 1 series, scarcely broader distally. Pollen grains ca. 27 μm in diam.

PARATYPES: COLOMBIA. Norte de Santander: Cordillera Oriental, eastern slope of Páramo del Hatico, en route from Toledo to Pamploma, 2800 m, edge of woods; 12 Mar 1927; *E.P. Killip & A.C. Smith 20602* (GH, NY, US); Páramo de Hatico, en route from Toledo to Pamploma, ca. 2900 m, 12-13 Mar 1927; *E.P. Killip & A.C. Smith*

20616 (GH, NY, US); Páramo de Fontibón, 2600-2750 m, 10-16 Oct 1941; *J. Cuatrecasas, R.E. Schultes & E. Smith 12329* (COL, US); Páramo de Tamá, vertiente de Samaria, 2600-2900 m, 29 Oct 1941; *J. Cuatrecasas, R.E. Schultes & E. Smith 12731* (COL, US).

Material of *Ageratina killipii* was initially identified with the Colombian and Venezuelan species now known as *A. theaefolia* (Benth.) R.M. King & H. Rob., but was placed more recently with *A. flaviseta* because of the spreading yellow hairs of the stems. It differs from both of these by the few florets in the heads, and the oblong involucral bracts with glabrous outer surfaces. It differs further from *A. theaefolia* by the unfurrowed veinlets of the leaves. The bracts and number of florets also distinguish the species from *A. persetosa* and *A. rangelii* described above. Though there are a few hairs on the veins of the leaves of *A. killipii*, the petioles are mostly glabrous in contrast to the stems.

Ageratina *(Andinia)* ***trianae*** H. Rob., **sp. nov.** TYPE: COLOMBIA. Cundinamarca: Bogota, s.d., *J.J. Triana 1229* (holotype US, isotype BM). (Fig. 4).

Ad Ageratinam tinifoliam maxime simila sed in foliis angustioribus et acutioribus in inflorescentibus elevatioribus in bracteis involucri ineaqualioribus in floribus 10-12(-15) in capitulo et in achaeniis plerumque setuliferis distincta.

Glutinous shrubs or trees 1.3-4.0 (-10.0) m tall, with 1 or more trunks, moderately branching; stems rather hexagonal, with remnants of glands, without evident hairs; internodes mostly 1-3 cm long; branches usually ascending at 45-65° angles. Leaves opposite, petioles slender, 0.8-1.7 cm long; blades narrowly ovate to elliptical, mostly 3.5-9.0 cm long, 1.0-3.5 cm wide, base short acute, margins multi-crenulate above middle, apex acute, surfaces glutinous, with scattered glandular dots, veinlets prominulous in a loose reticulum, venation pinnate with stronger basal 2 pairs of secondaries more ascending at 50-60° angles. Inflorescences terminal on leafy stems, broadly corymbiform, elevated above the subtending leaves; densely branched; peduncles 1-3 mm long, glutinous and sparsely pilosulous. Heads 5-8

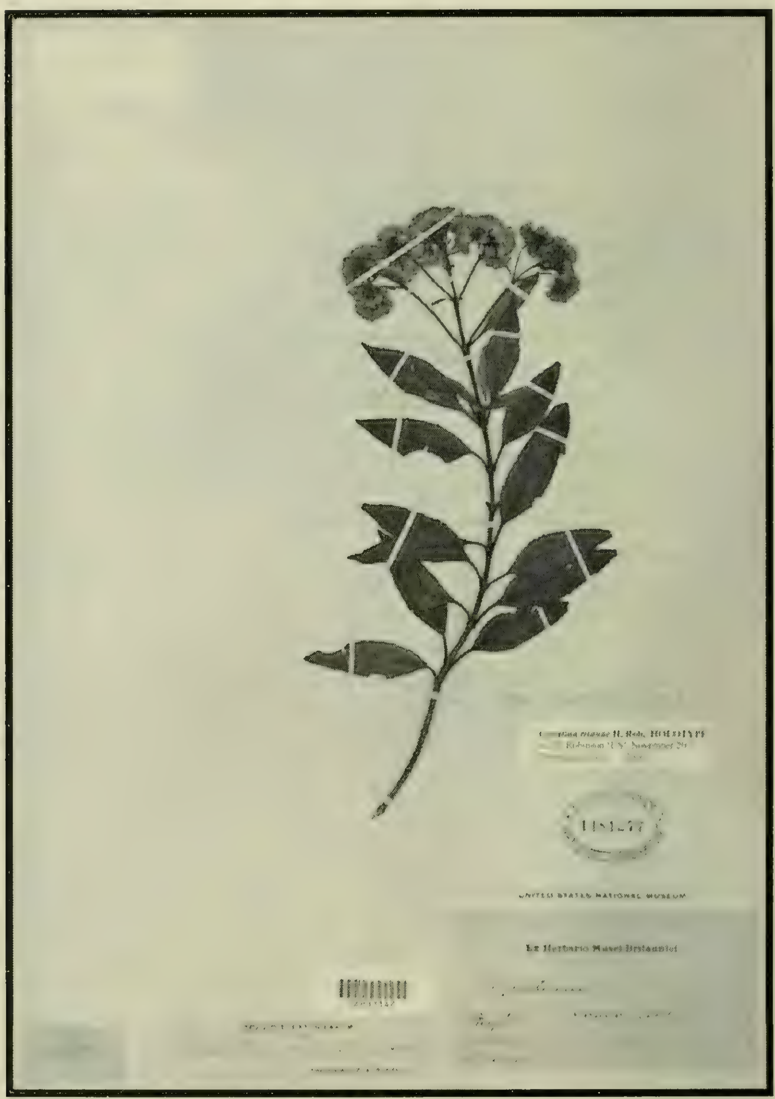

Fig. 4. *Ageratina trianae* H. Robinson, holotype, United States National Herbarium (US).

mm high, 2-4 mm wide; involucre subimbricate, 4-5 mm high, with 14-17 membranaceous bracts in 3 unequal series, mostly 1.5-4.5 mm long, 0.5-1.0 mm wide, apices rounded or obtuse. Thinly glutinous and usually hairless outside. Florets 10-12 (-15) in a head; corollas white, 4.5-5.0 mm long, mostly glabrous outside, basal tube ca. 1 mm long, with glands outside, throat 2.5-3.0 mm long, lobes 0.3-0.5 mm long, smooth outside, densely papillose inside; anther collars ca. 0.5 mm long; thecae reddish, ca. 1 mm long; apical appendage rounded, ca. 0.15 mm long, 0.18 mm wide; style base with node; style branches white or bluish. Achenes 2.0-2.3 mm long, usually setulose along ribs; carpopodium annuliform; pappus of ca. 25 whitish capillary bristles, ca. 4 mm long, sometimes broadened, but not broader at tips. Pollen grains ca. 27 µm in diam.

PARATYPES: COLOMBIA. **Department unknown**: *J.C. Mutis 4810* (MA, US); *J.J. Triana 46* (BM, US); *J.J. Linden 40* (BM, US). **Antioquia:** Valle del Cocuy, SW slopes, 3100-3750 m, 8 Sep 1938, *J. Cuatrecasas 1284* (COL, US); Pass at Sta. Elena, near Medellín, 2300 m, 16 Oct 1945, *W.H. Hodge 6561* (US). Boyacá: Municipio de Susacón, vereda de Guantiva, páramo del Dasaguadero, ciénaga del Visitador, 3300 m, 8 Aug 1958, *R. Jaramillo-Mejia, J. Hernández-Camacho & Th. Van der Hammen 973* (COL, US); Sierra Neveda del Cocuy, Alto Ritacuva, ca. 3850 m, 29 Apr 1959, *H.G. Barclay & P. Juajibioy 7497* (COL, US); Quebrada de San Paulino próximo Alto Ritacuva. ca. 3650 m, 3 May 1959, *H. G. Barclay & P. Juajibioy 7522* (COL, US); Páramo desde el Alto de Canutos a Las Gaitas, km 47, 3450 m, 13 Sep 1969, *J. Cuatrecasas & L. Rodriguez 27770* (COL, US); Páramo de La Rusia, NW-N de Duitama, Peña Blanca, 2 km al NE de Buenos Aires, 3780 m, 16 Dec 1972, *A.M. Cleef &R. Jaramillo-M. 7386* (COL, US); Valle del río Pómeca. Carretera a Sotaquirá, 3000 m, 20 Oct 1972, *H. Garcia-Barriga 20372* (COL, US); In valley Cañon de Mamarramos, 12 km N of Villa de Leyva, edge of Páramo at about 3400 m, 30 Jan 1981, *M. Melampy 1272* (US); Mpio. Duitama, corregimiento El Carmen vereda El Carmen, páramo de la Rusía, Macizo Santandereano, 3600 m, páramo perturbado. 6 Nov 1993, *J. Betancur et al. 4190* (COL, US). **Cundinamarca:** SW of Las Cruces, Bogotá,2700-2800m, 24-25 Sep 1917, *F.W. Pennell 2181* (NY,US); Guadalupe, 3000 m, Nov 1911, *Bros. Apollinaire & Arthur 86* (US);

Around Bogotá, 1917, *Bro. Ariste-Joseph A37* (US); Páramo de Bogotá, 1917, *Bro. Ariste-Joseph A248* (US); Páramo de Guasca, Jan 1920, *Bro. Ariste-Joseph A540* (US); Suba Hill, near Bogotá, 7 Sep 1945, *H. Schiefer 701* (US); Cordillera Oriental vertiente Oriental, (Páramo), Valle del río San Cristobal, Alto de la Horqueta, 3500-3575 m, 16 Nov 1958, *H. García-Barriga 16209* (COL, US); Macizo de Bogotá, eastern drainage, Páramo de Palacio (Hacienda La Siberia), El Tablón, 3350 m, 14 Sep 1961, *J. Cuatrecasas, M.T. Murillo & R. Jaramillo M. 25662* (COL, US); Northern end of Sabana near Suba, Finca San Pedro, hill covered with residual Andean forest, 2620-2700 m, 13 Sep 1961, *J. Cuatrecasas & J. Jaramillo M. 25961* (COL, US); Mpio. De Zipaquirá, Páramo de Guerrero, 3200 m, 20 May 1985, *A. Sanabria, G. Lucero. L.C. Sanabria & M. Sánchez 135* (COL, US). **Santander:** Mountains east of Las Vegas, 3000-3300 m, 20-21 Dec 1926, *E.P. Killip & A.C. Smith 15841* (GH, NY, US); Western slope of Páramo Rico, 3600 m, 15-19 Jan 1927, *E.P. Killip & A.C. Smith 17700* (GH, NY, US); Páramo de Romeral, 3800-4100 m, 29-30 Jan 1927; *E.P. Killip & A.C. Smith 18524* (GH, NY, US); Páramo del Almorzadero, extremo sur, Peralonso, 3200 m, 19 Jul 1940, *J. Cuatrecasas & H. García-Barriga 9895* (COL, US); Páramo de Almorzadero, 31 Dec 1959-1 Jan 1960, *H.G. Barclay & P. Juajibioy 10415* (COL, US); Peralonso, Timocato, páramo, 3360 m, 20 Sep 1969, *J. Cuatrecasas & L. Rodríguez 27872* (COL, US).

The new species is based on what has previously been called *Ageratina fastigiata* (H.B.K.) R.M. King & H. Rob. in Colombia. Even though the name *Eupatorium fastigiatum* was applied to Colombian material by B.L. Robinson (1918b), he correctly recognized that the type was from northern Peru. In fact, that name properly belongs to the species that has been known as *Ageratina exerto-venosa* (Klatt) R.M. King & H. Rob. in southern Ecuador and northern Peru. Hieronymus (1905) published the name *Eupatorium pseudofastigiatum*, but the latter was mistakenly applied to the typical element of *Eupatorium fastigiatum*. No other name has been provided for the Colombian species.

The new species has the appearance of the common *Ageratina pseudochilca* (Benth.) R.M. King & H. Rob. of Ecuador, but the latter

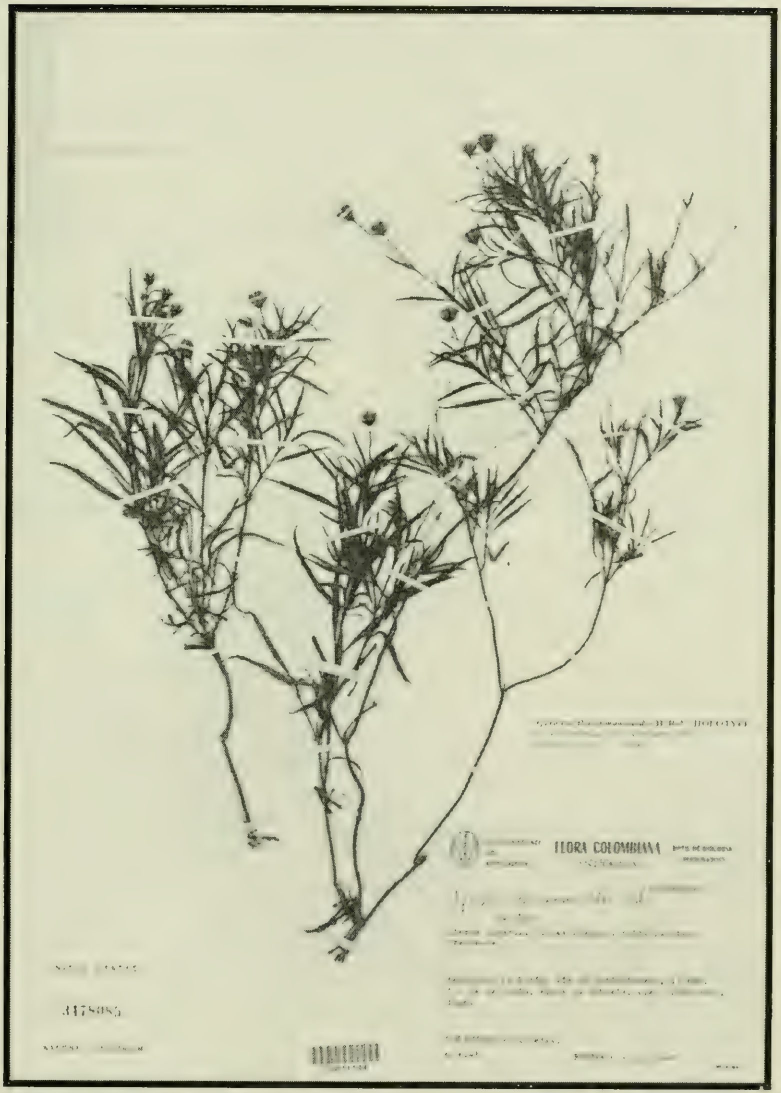

Fig. 5. *Ageratina fleischmannioides* H. Robinson, holotype, United States National Herbarium (US).

has involucral bracts of equal length, only 5-8 florets in a head, and achenes almost never setuliferous. Closest relationship is to the mostly Colombian *A. tinifolia* (HBK) R.M. King & H. Rob., and there are some apparent intergradations. Nevertheless, *A. tinifolia* characteristically has broader leaves with blunter tips, eximbricate to somewhat less subimbricate involucral bracts, and 19-25 florets in the head. *Ageratina trianae* differs from both *A. pseudochilca* and *A. tinifolia* by the inflorescence being raised above the subtending leaves. Setulae on the achenes are usually present in *A. trianae* but they are sometimes equally developed in *A. tinifolia*. *Ageratina cuatrecasasii* R.M. King & H. Rob. of the Sierra de Perija is also related, but has much larger heads with 35-50 florets.

Ageratina** (Ageratina) **fleischmannioides H. Rob., **sp. nov.** TYPE: COLOMBIA. Antioquia: Municipio La Unión, Vía La Unión – Sonsón, 15 kms SE de La Unión, Finca La Rubiela, 2300 m, 6 Apr 1988; *R. Callejas 6248* (holotype US, isotypes HUA, NY). (Fig. 5).

Herbae in habitis a Fleischmanniam sideritides et F. cuatrecasasii simila sed in bractis involucri et floribus ageratiniformibus distincta.

Plants herbaceous, 3-4 dm tall from creeping or clustered bases, moderately to densely branched; stems weakly quadrangular or hexagonal, pilose above, becoming glabrous. Leaves opposite, petioles 0.1-0.2 cm long, scarcely distinct from narrow blades; blades narrowly lanceolate, mostly 1.5-3.5 cm long, 0.2-0.4 mm wide, base and apex narrowly acuminate, margins narrowly recurved, with ca. 3 large teeth, surfaces glabrous, paler below, without glandular dots; venation pinnate with ca. 3 short pairs of spreading secondaries. Inflorescence with one or two long-pedunculate heads at tips of leafy stems, peduncles 1.5-2.5 cm long, 2-4 linear bracteoles 3-4 mm long, paired or alternate. Heads 6-7 mm high, 5-6 mm wide; involucral bracts ca. 20, in ca. 2 series, subequal, ca. 6 mm long, 1 mm wide, narrowly acute, glabrous outside, bicostate; florets ca. 17 in a head; corolla white, ca. 3.5 mm long, basal tube ca. 1.5 mm long, throat ca. 1.5 mm long, lobes ca. 0.6 mm long, glabrous, smooth outside, densely papillose inside; anther collars ca. 0.3 mm long, cell walls not obscured by thickenings;

thecae pale, ca. 0.7 mm long; apical appendages semicircular, ca. 0.2 mm long and wide; style base scarcely enlarged. Achenes ca. 3 mm long, densely setulose on ribs and upper surfaces; carpopodium cylindrical; pappus of ca. 25 easily deciduous white bristles, to 2.5 mm long, scarcely broadened at tips. Pollen grains ca. 25 µm in diameter.

PARATYPES: COLOMBIA. Antioquia: Municipio La Unión, localidad San Miguel, la Cruz, finca La Esperanza, crece sobre musgos, flores blancas "sirve para las llagas", 4 Apr 1984, *A. Zapata & E. Cespedes 4* (HUA, MO); Mpio. Sonsón, vereda Ventiadero, sitio La Morelia, quebrada La Negra, en la via La Unión – Sonsón, 2100 m, bosque montano, 5°45'N, 75°23'W, hierba riparia, sobre rocas, en lecho de quebrada, capitulos blancos, rara, localmente abundante, 16 Aug 1992, *R. Callejas & F.J. Roldán 10478* (HUA, NY).

Ageratina fleischmannioides is known only from the type and paratype series from Antioquia, Colombia. The habit is similar to species of *Fleischmannia* such as *F. cuatrecasasii* R.M. King & H. Rob., *F. haughtii* R.M. King & H. Rob. and *F. sideritides* (Benth. ex Őrsted) R.M. King & H. Robinson, that occur in or near the Pacific coast area of Colombia, but the combination of narrow leaves and the habitat on mossy rocks along streams seems unique in *Ageratina*.

Ageratina** (Andinia) **dillonii H. Rob., **sp. nov.** TYPE: PERU. Lambayeque: Ferrenafe, ca. 7 km NW of Incahausi, near Cerro Punamachay on trail to Laguna Hualtaco, Jalca formation dominated by *Stipa* grass, 3300-3550 m, shrub to 1.5 m, florets white, 16 Nov 1984, *M.O. Dillon & D. Skillman 4144* (holotype US; isotype F). (Fig. 6).

Ad Ageratinam piurae simila sed in foliis leniter serrulatis supra glandulopunctatis subtus albo-tomentosis et in bracteis involucri anguste acutis distincta.

Shrubs to 1.5 m tall, densely branched; stems terete, ridged, thinly white tomentose, becoming sordid below; internodes 0.8-1.5 cm long. Leaves opposite, petioles slender, mostly 7-9 mm long; blades thinly coriaceous, elliptic-ovate, mostly 2.5-3.5 cm long, 1-2 cm wide, base

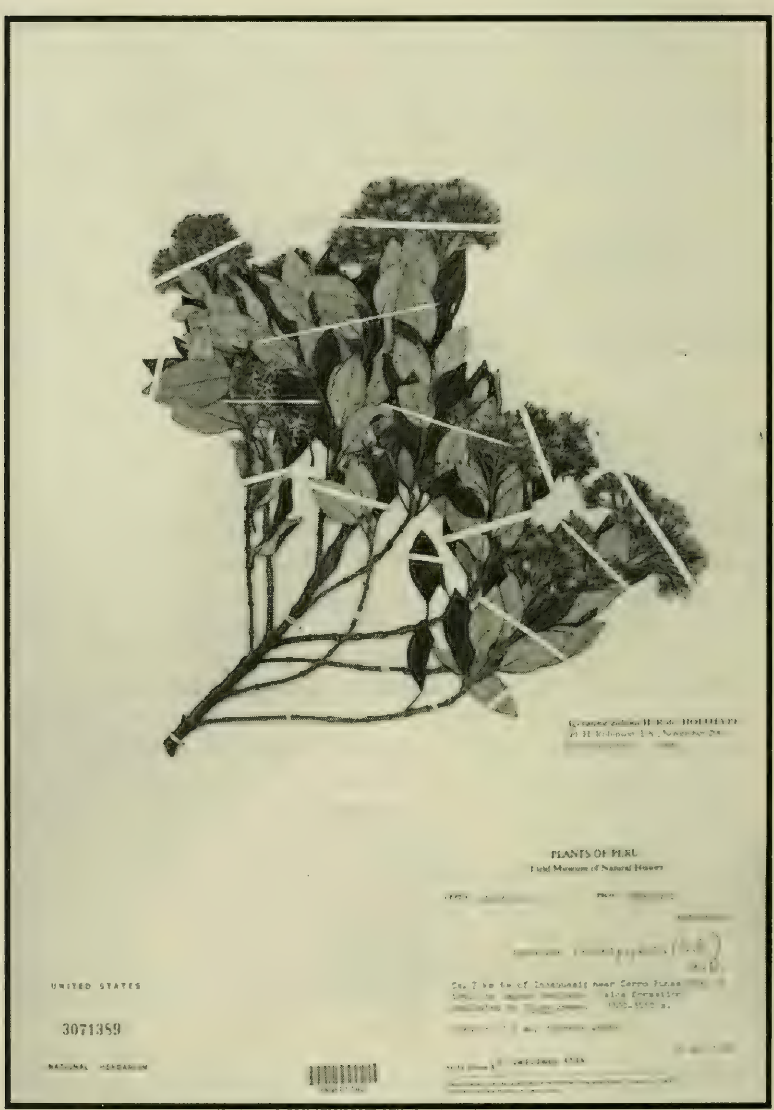

Fig. 6. *Ageratina dillonii* H. Robinson, holotype, United States National Herbarium (US).

obtuse to short-acute, margins with few small teeth, appearing entire, apex shortly acute, upper surface dark green, densely glandular-punctate, minutely puberulous on larger veins, lower surface densely white-tomentose; venation pinnate with ca. 4 erect-patent secondary veins in each half, midvein weakly prominent. Inflorescence rather abruptly terminal on leafy branches, broadly corymbiform, rather dense; peduncles mostly 2-6 mm long, white-tomentose; heads 8-9 mm high, ca. 4 mm wide; involucral bracts 5-8, linear-lanceolate, ca. 5 mm long, 0.8-1.0 mm wide, tips narrowly acute, outside thinly white-tomentose; florets 6-10 in a head; corollas white, ca. 6.5 mm long, glabrous, basal tube ca. 2 mm long, throat ca. 3 mm long, lobes 0.5-0.8 mm long, smooth outside, densely papillose inside; anther collars ca. 0.5 mm long, thecae reddish, ca. 1.3 mm long; apical appendage oblong-ovate, ca. 0.35 mm long; style base distinctly enlarged. Achene 2.8-3.3 mm long, with minute glands on ribs; carpopodium annuliform; pappus of ca. 30, white, capillary bristles ca. 5 mm long, not broadened distally. Pollen grains ca. 27 µm in diameter.

Ageratina dillonii is known only from the type collection. The species belongs to a small group in northern Peru with tomentose leaf undersurfaces. Both relatives, *A. piurae* (B.L. Rob.) R.M.King & H. Rob. of Piura and *A. chachapoyensis* (Cuatrec.) R.M.King & H. Rob. of Amazonas have more sordid tomentum, more obtuse or rounded leaf bases, more toothed or crenate leaf margins, blunter involucral bracts, and darker pappus bristles. The Piura species is closer in number of florets in a head, 10-15, but has a totally non-punctate leaf upper surface between its veins. The Amazonas species has punctate leaves, but it has 35-50 florets in the heads.

The new species has a strong superficial resemblance to the distantly related *Grosvenoria lopezii* of Piura, Peru, in the size and shape of the leaves and in the pale tomentose undersurfaces of the leaves.

Ageratina** (Ageratina)* ***acevedoi H. Rob., **sp. nov.** TYPE: BOLIVIA. Cochabamba: Prov. Sacaba, new road from Cochabamba to Santa Cruz, Cruce to Tablas Monte, 5 km from Represa de Corani, 2000 m, 25 Jul 1994, *P. Acevedo-Rdgz, A. Ferruci & M. Fernandez 6577* (holotype US). (Fig. 7).

Ad Ageratinam glechonophyllam simila sed in capitulis minoribus et in involucris distincte brevioribus non stipitato-glanduliferis distincta.

Erect to decumbent herb or subshrub, 0.5-1.0 m tall; moderately branched; stems terete, brown, densely pilose to hirtellous; internodes mostly 4-7 cm long. Leaves opposite, petioles slender, ca. 1 cm long; blades ovate, thinly herbaceous, mostly 2.5-5.5 cm long, 1.5-3.5 cm wide, base obtuse to slightly cordate, margins serrulate to serrate with 5-10 blunt teeth, apices of stem leaves narrowly acuminate, both surfaces pilose, more concentrated on veins below, lower surface slightly paler, without glandular dots; trinervate near base. Inflorescences broadly corymbiform or thyrsiform with corymbiform clusters; peduncles mostly 4-8 mm long, densely puberulous to hirtellous. Heads 5-6 mm high and wide; involucre short, eximbricate, of 13-16 elliptical, membranaceous bracts, mostly 3.0-3.5 mm long, ca. 0.8 mm wide, apex obtuse to short-acute, scarious, outside bicostate, sparsely to densely puberulous. Florets 25-27 in a head; corollas white, 2.5-3.5 mm long, basal tube slender, 1.0-1.5 mm long, throat campanulate, 1.0-1.5 mm long, lobes 0.3-0.5 mm long, smooth and sparsely pilosulous outside, densely papillose inside; anther collars ca. 0.2 mm long; thecae pale, 0.5-0.6 mm long; apical appendages oblong-ovate, ca. 0.15 mm long, 0.13 mm wide; style base with enlarged node. Achenes fusiform, ca. 1.8 mm long, with short setulae dense along ribs, sides bare except above; carpopodium pale, cylindrical; pappus 2.5-3.0 mm long, of ca. 25 easily deciduous bristles slightly broadened distally. Pollen grains ca. 18μm in diam.

PARATYPE: BOLIVIA. La Paz: Sud Yungas, Pariguaya Plazuela, en el valle seco del río Chunganayo, 16°40'S 67°29'W, 2250 m, 30 Apr 1995, *St. Beck 22434* (LPB, US).

Ageratina acevedoi is one of two Bolivian species described here with small corollas and short involucral bracts. The two differ from the common *A. glechonophylla* (Less.) R.M. King & H. Rob. of Chile,

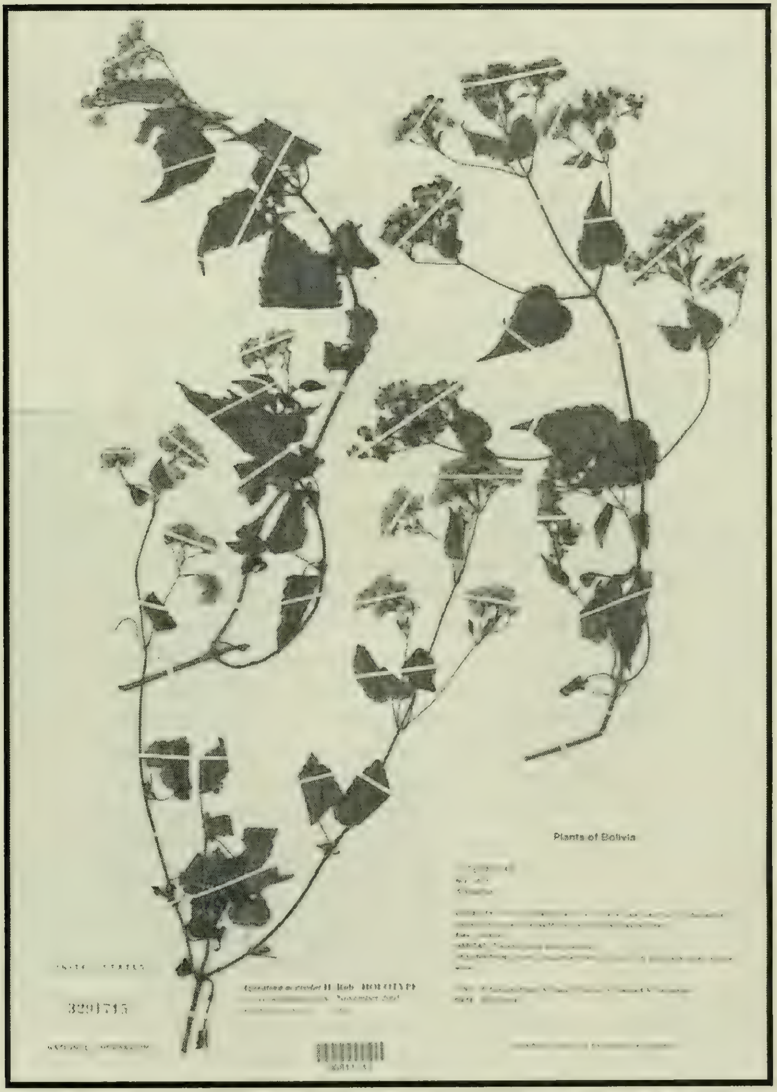

Fig. 7. *Ageratina acevedoi* H. Robinson, holotype, United States National Herbarium (US).

Bolivia, Peru and southern Ecuador by the small heads and the lack of stipitate glands in the inflorescence. Of the two new species, *A. acevedoi* is distinct by the hairy stems and leaves and by the achenes with densely setuliferous ribs.

Ageratina** (Ageratina)* ***feuereri H. Rob., **sp. nov.** TYPE: BOLIVIA. La Paz: Prov. Bautista Seavedre, Charazani-Tal, linke Talseite oberhalb der Furt bei Cilij, am Weg Richtung Chullina, Veg.-Aufn 289, 2900 m, 4 Apr 1980, *T. Feuerer 4068a* (holotype US, isotype LPB).

Ad Ageratinam acevedoi simila sed in caulibus foliis pedunculis et involucris vix sparse puberulis vel glabris et in achaenia plerumque non setuliferis differt.

Erect subshrubs to 0.5 m tall, rather densely branching; stems subquadrangular, mostly glabrous. Leaves opposite, petioles 0.2-0.5 cm long; blades ovate, herbaceous, mostly 1.5-2.5 cm long, 0.8-1.4 cm wide, base rounded, margins with ca. 8 blunt, minute serrulations, apex acute, upper surface essentially glabrous with puberulous veins, lower surface sparsely, minutely puberulous, with dark reticulum of veinlets, without glandular dots; trinervate at or near base. Inflorescences with small corymbiform clusters slightly exerted at ends of leafy branches; peduncles 2-7 mm long, minutely, sparsely puberulous. Heads 5-6 mm high and wide; involucral bracts ca. 20, oblong-elliptical, mostly ca. 3.5 mm long, 1 mm wide, often reddish distally, short-acute, outside with few minute hairs. Florets 17-25 in a head; corollas white, ca. 3.2 mm long, basal tube slender, ca. 1.3 mm long, throat abruptly campanulate, ca. 1.3 mm long, lobes 0.5-0.8 mm long, smooth with sparse minute hairs outside, densely papillose inside; anther collars ca. 0.35 mm long; thecae pale, ca. 0.8 mm long; apical appendage semicircular, ca. 1.5 mm long; style with basal node. Achenes ca. 2.9 mm long, fusiform, with short spicules on ribs, a few longer setulae near pappus; with pale cylindrical carpopodium; pappus of ca. 30 easily deciduous bristles ca. 3.2 mm long, not broadened beyond middle. Pollen grains ca. 18 µm in diam.

Ageratina fewereri is presently known only from the type. It is closely related to *A. acevedoi*, but differs by the nearly glabrous stems, leaves and involucres and the achene ribs with only small spicules and a few setulae. The single specimen also seems to have a more erect shrubby habit and a more diffuse inflorescence with smaller clusters of heads. None of the leaves has narrowly acuminate tips.

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HIPPEASTRUM UGENTII (AMARYLLIDACEAE: HIPPEASTREAE): A NEW SPECIES FROM CENTRAL PERU

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ABSTRACT

A new species from central Peru (Prov. Tayacaja, Dept. Huancavelica), *Hippeastrum ugentii* Ochoa, is described and illustrated. It is characterized by its large bulbs, very long leaves, stout scape, multifloral umbel and showy flowers.

Key Words: *Hippeastrum ugentii*, Amaryllidaceae, Peru, new species.

I dedicate this new species of *Hippeastrum* to my friend and distinguished botanist, Dr. Donald Ugent.

Hippeastrum ugentii Ochoa **sp. nov.**

TYPE PERU: Dept. Huancavelica, prov. Tayacaja, distr. Salcabamba, near Tastapata ± 2800 m, on slopes in stony soil. October 15, 2001. *C. Ochoa & E. Paraguay 16402* (Holotype MJP; isotypes: CUZ, CPUN, HUT, MO and MOL).

Bulbus ovoideus, 10-12 cm longus, 6.5-7.5 cm diametrum. Folia pendulous, lanceolatum planum acutum 1.20-1.50 m longus vel plus, 3.5-6.0 cm latus ad basin, atrovirens. Scapus robustus pallide viridibus, teres vel leviter subapplanatus, 40-45 cm longus, 2.0 cm latus, ad basim 1.5 cm ad apicem, racemo multifloro terminatus. Bracteae perigoniales 2, lanceolatae albidus papyraceus, marcescens, 8.0-8.5 cm longus, 2.8-3.2 cm latus ad basim, apex accutum. Umbella 12-15 florum. Perigonium albus et bruneolus-roseus venati, 9.5 cm longus. Tepala tubus 9.5 cm longus, 5-6 mm grossus; externus tepala 9.0-10.0 cm longus, 2.0-2.5 cm latus; internus tepala 10.0 cm longus, 2.8-3.2 cm latus. Stamina unaequalis 4.5 et 5.5 cm longis, brevis quam stylus, filamenta roseolus; antheras lunulatus, albus, post dehiscentiam 1.0-1.4 cm longum, pollinae albidus instructus. Stylus filiformis, 15-16

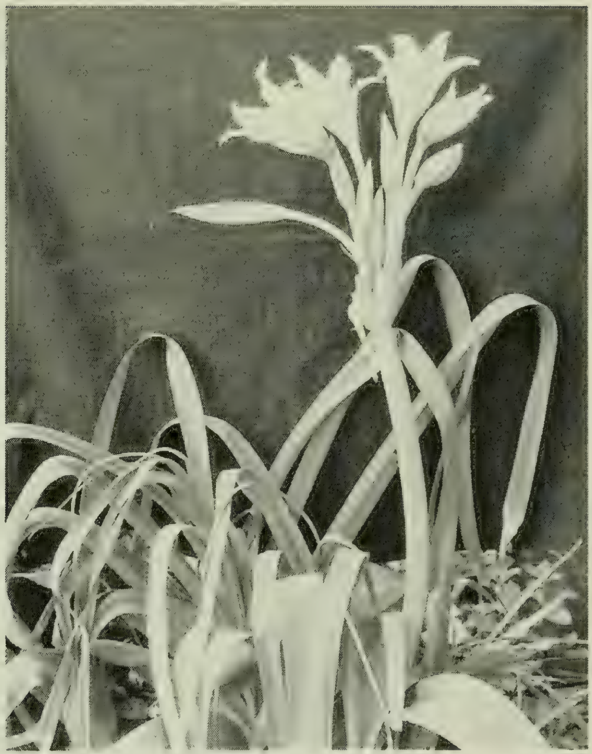

Fig. 1. Photo of *Hippeastrum ugentii.*

cm longus, usque ad tertium roseolus, stigma parvum capitatum trilobum, ovarium viride oblongus 1.5 cm longus. Pedicellus 2.0-3.0 cm longus.

Bulb ovoid, large, 10-12 cm long by 6.5-7.5 cm in diam. Leaves pendulous, dark green, lanceolate, 1.2-1.5 m long by 3.5-6.0 cm wide at the base and narrowly acute at apex. Scape stout, light green, cylindrical or slightly subcylindrical, 40-50 cm long, 2 cm diam. at base and 1.5 cm at apex, ending in a multi-flowered umbel. Perigonal bracts papyraceous, marcescent, widely triangular-lanceolatate, 8.0-8.5 cm long by 2.8-3.2 cm wide at base, with an acute apex. Perigonium 9.0-10.0 cm long, white, tinged with a narrow, brownish-rose

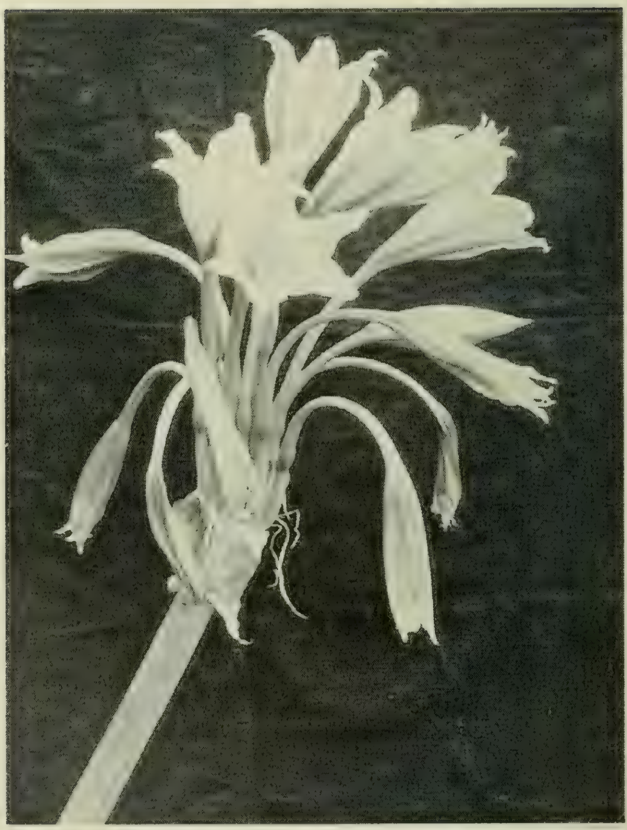

Fig. 2. Umbel of *Hippeastrum ugentii.*

longitudinal band; tube ca. 9.5 cm long by 5-6 mm thick, light green; external tepals narrowly lanceolate, 9.0-10.0 cm long by 2.0-2.5 cm wide; internal tepals of the same length, but of slightly greater width than the external ones. Stamens with unequally long filaments, the shorter 4.0-4.5 cm long, and the larger about 5.5 cm; filaments pale pink; anthers lunulate, white, 1.0-1.2 cm long at postdehiscents. Styles filiform, 15-16 cm long, pale pink in the upper one-third of their length; stigmas very small and capitate-trilobed. Ovary light green, oblong, ca. 15 mm long. Pedicels 2.0-3.0 cm long.

A NEW VARIETY OF *JUNIPERUS SABINA* FROM MONGOLIA: *J. SABINA* VAR. *MONGOLENSIS*

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ABSTRACT

A new variety of *Juniperus sabina* L. (var. *mongolensis* R. P. Adams) is recognized from Mongolia. It was discovered growing on sand dunes south of Ulan Batar. It differs from *J. sabina* var. *arenaria*, which occurs on sand dunes at Lake Qinghai, China, in that it has more seeds per cone, the seeds are globose, and the terminal branchlets grow only on the top (upper) side of the branchlets. A key to the varieties of *J. sabina* is presented.

KEY WORDS: *Juniperus, J. sabina* var. *mongolensis,* taxonomy, Cupressaceae, Mongolia.

The genus *Juniperus* consists of approximately 67 species (Adams, 2004; Farjon, 2005), all native to the northern hemisphere, although, *J. procera* Hochst. ex Endl. grows southward along the rift mountains in East Africa into the southern hemisphere (Adams, 2004). A recent monograph of the genus (Adams, 2004) divides *Juniperus* into three sections: *Caryocedrus* (one species, *J. drupacea* Labill.); *Juniperus* (= *Oxycedrus*, with 11 species) and *Sabina* (the remaining 55 species). Section *Sabina* can be subdivided into junipers with serrate leaf margins vs. those with entire (smooth) leaf margins. The serrate leaf margined junipers are confined to the western hemisphere, except for *J. phoenicea* L. which seems more allied with the smooth leaf margined junipers (Schwarzbach et al., 2007).

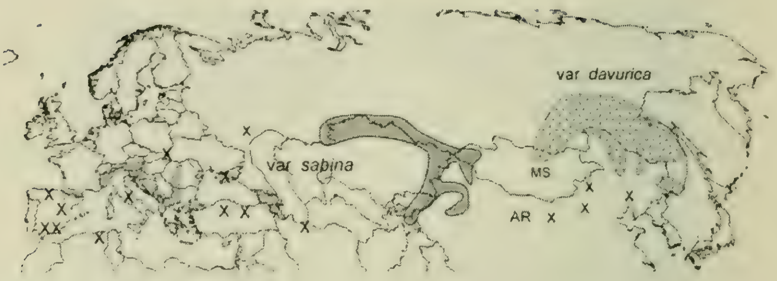

Figure 1. Distribution of *Juniperus sabina* and it varieties. AR = *J. s.* var. *arenaria*; MS = *J. sabina* on Mongolian sand. Xs represent outlying populations of *J. sabina.*

The species of section *Sabina* of the eastern hemisphere can be further divided into two groups based on the number of seeds per female cone (often refered to as a berry) and female cone shape. The single seed/cone (single seeded) *Juniperus* of the eastern hemisphere have cones that are ovoid with a noticeable pointed tip, whereas the multi-seeded *Juniperus* are generally globose and often have an irregular surface. *Juniperus sabina* L. is a smooth leaf margined, multi-seeded juniper of the eastern hemisphere. It is very widely distributed from Spain through Europe to Siberia (Fig. 1). It is generally a small shrub less than 1m tall and ranging up to 1-2 m wide. However, in the Sierra Nevada of Spain, it forms a prostrate shrub on rocky areas and in Mongolia it occurs as a prostrate plant on sand dunes (MS, Fig. 1).

Recently, Farjon (2001) transferred *J. chinensis* L. var. *arenaria* E. H. Wilson to *J. sabina,* as *J. sabina* var. *arenaria* (E. H. Wilson) Farjon (AR, Figure 1). In addition, Farjon (2001) transferred *J. davurica* Pall. to *J. sabina* as *J. sabina* var. *davurica* (Pall.) Farjon.

DNA sequencing of nrDNA and trn C-trnD (Schwarzbach et al., 2007) has led to a different interpretation of the relationships within the *chinensis-davurica-sabina* complex (Fig. 2). *Juniperus chinensis* and *J. procumbens* (Siebold) ex Endl. are well supported (100%) as being distinct from *J. sabina* and its varieties (Fig. 2), as has been shown by their essential oils and RAPD data (Adams, 1999). Among the *J.*

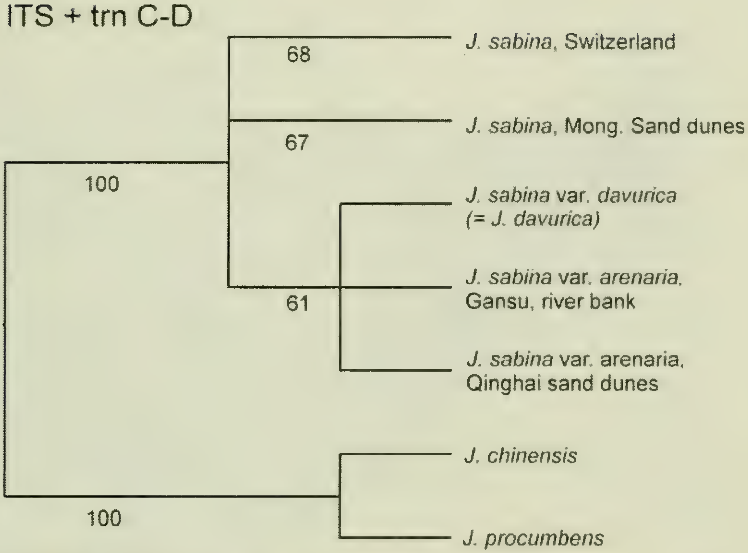
ITS + trn C-D
68
67
100
61
100
J. sabina, Switzerland
J. sabina, Mong. Sand dunes
J. sabina var. davurica (= J. davurica)
J. sabina var. arenaria, Gansu, river bank
J. sabina var. arenaria, Qinghai sand dunes
J. chinensis
J. procumbens

Figure 2. Phylogenetic tree adapted from Schwarzbach et al. (2007). Note the placement of *J. sabina*, on Mongolian sand dunes as a distinct taxon.

sabina, *J. s.* var. *arenaria* and *J. s.* var. *davurica*, samples, there was support (61-68%) for recognition of infraspecific taxa (Fig. 2).

In addition, there was support (67%) that *J. sabina* from the Mongolian sand dunes is a distinct taxon (Fig. 2). It is clear that this juniper in not the same as *J. sabina* var. *arenaria* from sand dunes at Lake Qinghai, China (Fig. 2). Comparing the *J. sabina* on Mongolian sands versus *J. s.* var. *arenaria*, the seeds are 2-4 per cone vs. (1) 2 (3-4), and are flattened globose with an obtuse tip (vs. an elongated ellipsoid with an acute tip that resemble a duck bill) and ultimate branchlets that grow from the top (upper) side of long lateral branches (vs. radially distributed branching). It is appropriate to recognize the prostrate *J. sabina* growing on sand in Mongolia as a new variety.

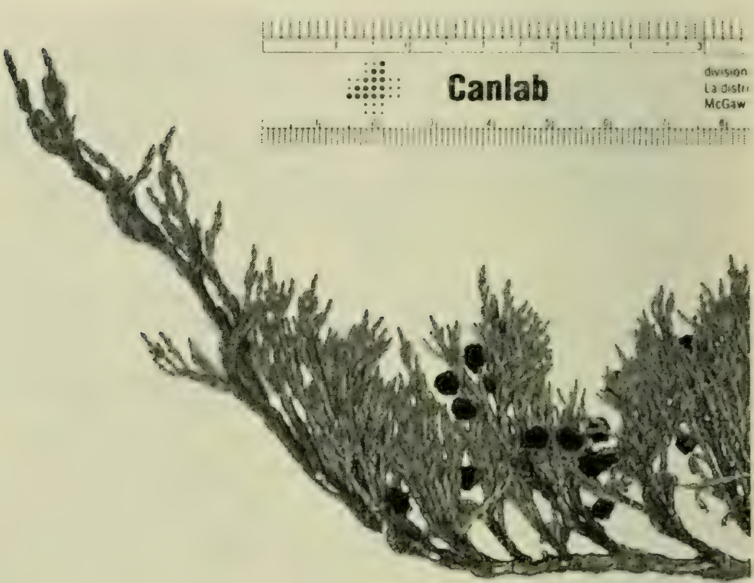

Figure 3. Specimen (*Adams 7255*) showing the branching on the upper portion of the lateral branchlets.

Juniperus sabina var. **mongolensis** R. P. Adams, **var. nov.** TYPE: Mongolia, 80 km sw of Ulan Batar, Mongolia, N 47° 36.691', E 105° 09.332', 1230 m, on sand dunes, 16 Jun 1994, *Adams 7255* (HOLOTYPE: BAYLU, TOPOTYPES: *Adams* 7254, 7256, BAYLU), (Fig. 3).

Junipero sabina var. arenario similis sed differt strobilis femineis semina 2-4 efferentibus, seminibus globosis apicibus obtusis, et ramulis ultimis non nisi supra ramis lateralis crescentibus.

Similar to *Juniperus sabina* var. *arenaria*, but differing in the female cones containing [producing] 2-4 seeds, seeds globose with obtuse tips, and ultimate branchlets growing only on the top [upper] side of the lateral branches.

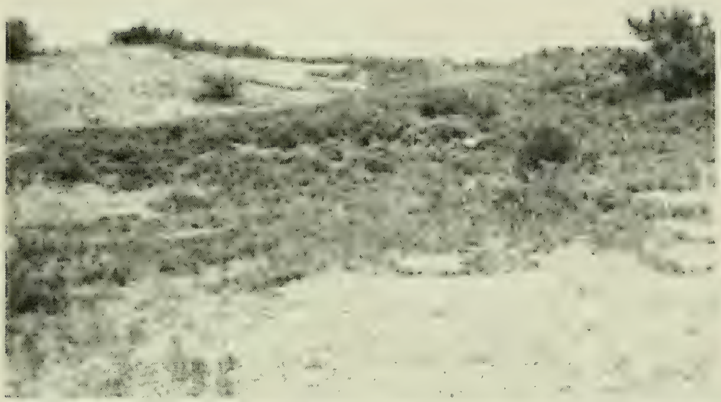

Figure 4. *Juniperus sabina* var. *mongolensis* growing on sand in Mongolia with very long terminal branches. All of the plants are prostrate. The shrubs in foreground are not *Juniperus*.

Other specimens examined: *J. chinensis*, CH, Lanzhou, Gansu, China, Adams 6765-67; *J. procumbens*, Japan, *Adams 8683, 8684, 9150*; *J. sabina*, Sierra Nevada, Spain, *Adams 7197, 7199, 7200*; Pyrenees Mtns., Spain/ France border, *Adams 7573-7577*; Switzerland, *Adams 7611, 7612, 7614, 7615*; Tian Shan Mtns., Xinjiang, China, *Adams 7836-7838*; *J. sabina* var. *arenaria*, sand dunes, Lake Qinghai, Qinghai, China, *Adams 10347-10352*; river bank, Gansu, J-q. Liu and *Adams 10354-10356*; *J. sabina* var. *davurica*, DV, 15 km se Ulan Bator, Mongolia, *Adams 7252, 7253, 7601*. Voucher specimens for all collections are deposited at Baylor University Herbarium (BAYLU).

The exact distribution of *J. sabina* var. *mongolensis* is not known at present, but it should be expected on sand in southern Mongolia (Fig. 4).

Key to *Juniperus sabina* varieties:

1. Both scale-like and whip- (decurrent with free tips) leaves found on mature plants, interspersed on a single branchlet, not just at the ends of rapidly growing branchlets, occasionally, one leaf type predominates.......................... var. *davurica*
1'. Whip (decurrent) leaves found only on juvenile plants or at the ends of rapidly growing branchlets, otherwise all leaves scale like

2. Shrubs to 1 m; growing on rocky areas, seeds with an acute tip that tapers into a globose shaped base, 1-3 per globose cone.. var. *sabina*

2'. Prostrate plants with long lateral branchlets, growing on sand, seeds with obtuse (occasionally acute when only one seed per cone) tip on ellipsoid to globose shaped base, 1-4 per cone

3. Most seed cones bi-lobed, seeds (1) 2 (3-4) per cone, seeds an elongated ellipsoid with an acute tip that resemble a duck bill, ultimate branchlets radially distributed around lateral branches...var. *arenaria*

3'. Most seed cones globose, seeds 2-4 per cone, seeds a flattened globose with an obtuse tip, ultimate branchlets growing from the top (upper) side of long lateral branches.. var. *mongolensis*

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BASELINE VEGETATION ANALYSIS FOR A REMNANT BLACKLAND PRAIRIE IN WALKER COUNTY, TEXAS

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ABSTRACT

Baseline vegetation data on a remnant blackland prairie in Walker County, Texas was collected using permanent vegetation plots as a basis for monitoring future vegetation changes. This remnant prairie is privately owned and is part of working cattle and hay production ranch named Lone Oak Ranch. Historically, the prairie has been managed to preserve this rare and globally imperiled habitat.

KEYWORDS: Floristics, Walker County, Texas, vegetation

INTRODUCTION

Lone Oak Ranch includes one of the largest and most pristine and/or well recovered blackland prairies known in the Pineywoods of East Texas. The habitat concerned is defined as the Little Bluestem (*Schizachyrium scoparium*)-Indiangrass (*Sorghastrum nutans*) Community Series (Texas Natural Heritage Program 1993). This plant association can be more narrowly defined in eastern Texas as the Little Bluestem (*Schizachyrium scoparium*) – Missouri Coneflower (*Rudbeckia missouriensis*) – Narrowleaf Gumweed (*Grindelia lanceolata*) – Cusp Gayfeather (*Liatris mucronata*) Prairie or West Gulf Coastal Plain Fleming Calcareous Prairie (NatureServe 2005); it is ranked as a G1 community, meaning that it is considered "critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction with typically 5 or fewer occurrences or very few remaining

Species	#1	#2	#3
Berchemia scandens		2067	
Bumelia lanuginosa		300	467
Celtis laevigata		267	
Cornus drummondii		7267	
Crataegus crus-galli		733	
Crataegus spathulata		200	
Diospyros virginiana		200	
Forestiera ligustrina		2267	
Gleditsia triacanthos	67	133	
Ilex decidua		267	
Ilex vomitoria		133	
Juniperus virginiana	200	67	
Ligustrum sinense		133	
Lonicera japonica		200	
Pinus taeda		67	
Prunus angustifolia		67	
Quercus virginiana		267	
Rhamnus caroliniana		533	
Rubus trivialis	733	2933	533
Symphoricarpos orbiculatus		7733	733
Toxicodendron radicans		333	
Vitis aestivalis		67	
All species	1000	30400	1733

Table 1. Woody species recorded in each plot in stems/ha. Woody species were counted in a 30-m X 5-m plot.

individuals (<1,000) or acres (<2,000) or linear miles (<10)" (Nature Conservancy 2000, NatureServe 2005).

This plant association is naturally rare in the West Gulf Coastal Plain, occurring only sporadically where areas of Vertisol soils are present over the Fleming geologic formation (Nature Conservancy 2000, NatureServe 2005). Very few high-quality examples are known, and most existing examples have been heavily degraded by past land uses, and many more have been completely converted to other land uses (Nature Conservancy 2000, NatureServe 2005, personal observation). Primary threats to this community include land development, fire suppression, livestock grazing, oil and gas exploration, soil harvesting, and impacts from road development and vehicle use. The historical fire frequency of this grassland is estimated to range from 5 to 20 years (NatureServe 2005). Woody species such as Eastern red cedar (*Juniperus virginiana*), gum bumelia (*Bumelia lanuginosa*), Alabama supplejack (*Berchemia scandens*), rough-leaf dogwood (*Cornus drummondii*), saw greenbrier (*Smilax bona-nox*), coral berry (*Symphiorcarpos orbiculatus*), southern dewberry (*Rubus trivialis*) and honey locust (*Gleditsia triacanthos*) invade this community and change the physiognomy as a result of fire suppression (NatureServe 2005, personal observation).

Lone Oak Prairie is composed of approximately 120 acres of remnant and/or restored blackland prairie. Historical ground disturbance such as farming and intensive grazing occurred throughout the property. However, these historically disturbed areas are now composed primarily of native herbaceous species typical for blackland prairies such Indiangrass, little bluestem, lovegrass (*Eragrostis intermedia*), meadow dropseed (*Sporobolus compositus*), and Florida paspalum (*Paspalum floridanum*). The most heavily disturbed portions of the prairie have a significant component of the invasive species, King Ranch (KR) bluestem (*Bothriochloa ischaemum*). However, the portion of the prairie located in the southeastern corner of the property appears to have avoided or successfully recovered from most of the historical ground disturbance and is in near pristine condition. In addition, KR bluestem is less prominent in this portion of the prairie.

Lone Oak Prairie is particularly susceptible to encroaching development. Interstate Highway 45 and heavily-traveled Highway 30 to Bryan-College Station intersect less than a mile to the east of the property. The resulting development (including gas stations, restaurants, hotels, and a Wal-Mart) is typical of the structures found at such major intersections. A newly constructed local roadway (parallel to I-45) and the associated structures (including office buildings and a shopping mall) are located less than ½ mile to the east between I-45 and the property and visible from the southeastern corner of the prairie.

A subdivision and other residences are located less than ½ mile to the west. Some of the residences to the west are also visible from the property. The surrounding forests are a matrix of pine-hardwood and bottomland hardwood forests with a dense shrub layer and sparse herbaceous understory.

MATERIALS AND METHODS

Plot establishment and measurement follow National Park Service protocol as outlined in the Western Region Fire Monitoring Handbook (1992) prepared by the Western Region Prescribed and Natural Fire Monitoring Task Force. Using this methodology, three brush plots were established in three different areas of the prairie. Each brush plot is a 30-meter transect line running in a north-south direction. Both ends of each transect were marked with rebar stakes and t-posts. To determine absolute cover of all species, all vegetation, contacting a 2-m tall rod placed perpendicular to the ground, was recorded every 30-cm along the 30-m transect for a total of 100 contacts. All woody species were recorded in a 30-m X 5-m plot along the transect. Herbaceous plant density was recorded using three 1-m x 1-m plots every ten meters along the transect. Plot 1 was established in a historically disturbed prairie where native herbaceous vegetation is becoming re-established. Plot 2 was established along the eastern edge of the prairie where woody species are beginning to encroach onto the grassland. Plot 3 was established in a near pristine portion of the prairie that is composed primarily of native herbaceous species. Nomenclature for species recorded in plots generally follows Diggs et al. (1999) and Turner et al. (2003). Vegetation was analyzed and quantitatively described following protocols outlined in the Fire Monitoring Handbook (NPS, 1992) and NPS National Fire Monitoring Handbook Software, Version 3.10.2.1 (Syndoriak, 1991).

RESULTS AND DISCUSSION

Data collected in this study provides baseline data in three portions of a remnant and/or recovering blackland prairie. This data will be used to monitor long term vegetation changes that occur from management activities such as prescribed burning, woody species encroachment, climate changes, etc. Table 1 illustrates all woody species recorded; Table 2 illustrates absolute cover for all species recorded along the 30-m^2 transect; and Table 3 illustrates herbaceous species recorded in three 1-m^2 transects.

ACKNOWLEDGMENTS

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Species (% Cover)	#1	#2	#3
Agalinis heterophylla			1.0
Ambrosia psilostachya	3.0	3.0	
Ambrosia trifida		2.0	
Amphiachyris dramunculoides	1.0	2.0	1.0
Andropogon glomeratus	5.0	7.0	7.0
Aristida longespica	1.0	2.0	1.0
Aristida oligantha	23.0	9.0	
Bothriochloa ischaemum			1.0
Bothriochloa laguroides	13.0	12.0	16.0
Bromus japonica		2.0	
Carex cherokeensis	9.0	2.0	5.0
Carex microdonta	3.0	2.0	1.0
Cornus drummondii		1.0	
Croton monathogynus	1.0	2.0	
Cuscuta indecora		5.0	2.0
Dalea multiflora	1.0	2.0	
Desmanthus illinoensis		3.0	
Dichanthelium scribnerianum	7.0	8.0	1.0
Eragrostis intermedia	5.0	6.0	
Euphorbia bicolor	11.0	7.0	
Grindelia lanceolata	10.0	2.0	2.0
Hedyotis nigricans		1.0	2.0
Indigofera miniata		1.0	
Iva annua	18.0	8.0	14.0
Liatris mucronata			1.0
Muhlenbergia capillaris		1.0	
Neptunia lutea	1.0		
Oenothera speciosa	1.0	1.0	
Oxalis stricta	1.0		
Paspalum floridanum		9.0	2.0
Paspalum setaceum	1.0		
Rubus trivialis		7.0	
Rudbeckia missouriensis	8.0	10.0	9.0

Salvia lyrata			1.0
Schizachyrium scoparium	5.0	30.0	51.0
Setaria parviflora	3.0	9.0	6.0
Solidago canadensis	2.0	1.0	4.0
Sorghastrum nutans	6.0	2.0	19.0
Sporobolus clandestinus	1.0	1.0	
Sporobolus compositus	26.0	17.0	24.0
Symphyotrichum ericoides	5.0		4.0
Symphoricarpos orbiculatus		7.0	
Verbena halei	1.0		
Verbena xutha	1.0		
Substrate	4.0	1.0	1.0

Appendix 1. All species recorded in cover transects in each plot according to absolute cover. Cover measurements were recorded every 0.3-m along a 30-m transect. Substrate includes leaf litter, duff, rocks, and bare soil.

SENECIO AMPULLACEUS (ASTERACEAE): A WEST GULF COASTAL PLAIN ENDEMIC NEW TO OKLAHOMA

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ABSTRACT

Senecio ampullaceus is reported as new to Oklahoma. The overall distribution of the species in the western Gulf coastal plain is discussed.

KEY WORDS: Asteraceae, *Senecio*, Oklahoma.

Senecio ampullaceus Hook. (Asteraceae) is not cited as occurring in Oklahoma by Taylor and Taylor (1994), USDA, NRCS (2006), Oklahoma Vascular Plants Database (Hoagland et al. 2006), and Barkley (2006), thus the records cited below constitute the first report of the species in the state.

Voucher specimens: U.S.A. OKLAHOMA. **Pushmataha Co.:** 2.1 miles S of jct. of Okla. Hwy 3 and Coffee Creek Road (NS412RD) on Coffee Creek Road, SW of Antlers, 8 Apr 2006, *Singhurst 14,109 & Powers* (BAYLU, OKL, TEX); 1.4 miles NW of jct. of Coffee Creek Road (NS412RD) and WD194 RD on Powers Ranch, 8 Apr 2006, *Singhurst 14,110 & Powers* (BAYLU, OKL, TEX).

The two populations of *Senecio ampullaceus* were located on open sandhills consisting of loose, deep sands above Beaver Creek, southwest of Antlers at approximately 180 m elevation. The first location (*Singhurst 14,109*) was along the right-of-way and onto private land and consisted of about 7 ha. The second location consisted of about 9 ha of sandhill ridge top. At the time of collection, immature plants were still emerging from the soil at both locations. Each population was estimated to consist of several thousand individuals. The sites were dominated by *Quercus stellata* var. *stellata*, *Q. marilandica*, *Carya texana*, *Callicarpa americana*, *Opuntia* sp., *Sassafras albidum*, *Prunus angustifolius*, and *Vaccinium arboretum*. Non-woody plants included *Pediomelum rhombifolium*, *Eragrostis secundiflora*, *Croptilon divaricatum*, *Loeflingia squarrosa*, *Monarda punctata*, *Phlox* sp., *Polypremum procumbens*, and *Tradescantia* sp. The locations are about 50 km northwest of the nearest known Texas occurrence in Red River County (*Singhurst, Carr, & White 14,089*, BAYLU).

Senecio ampullaceus was reported endemic to Texas (Correll and Johnston 1970; Diggs et al. 1999). It is very widespread in the eastern half of the state (Turner et al. 2003), but is usually limited to sandy soils. The species was reported in St. Louis, Missouri by Steyermark (1963) and is now considered to be adventive at that location (see http://biology.missouristate.edu/herbarium/advent.html). Singhurst and Holmes (1998) reported the species in Miller Co. in southwestern Arkansas, about 1.5 km east of the Texas stateline. At the time of collection of the Arkansas record, several hundred plants were observed on the road right-of-way, which was about 800 m long and 3 m wide (on each side), and in and on the edge of a 2.2 ha cultivated, sandy field. The vegetation at this site was very similar to that of the Texas Post Oak Savannah, being dominated by *Quercus incana*, *Q. stellata*, *Carya texana*, etc., but, as were the Oklahoma sites, less diverse (lacking such common Texas species such as *Penstemon murrayanus*, *Streptanthus hyacinthoides*, *Polygonella americana*, *Polanisia erosa*, *Hymenopappus artemisiifolius, Oenothera heterophylla, Tetragonotheca ludoviciana*, etc.). Barkley (2006) wrote that the species had been reported from Arkansas and Missouri (St. Louis), yet included only Texas in the stated distribution. This suggests that he considered the plant endemic to Texas and adventive in both Arkansas and Missouri. Certainly the Missouri record, being far removed from the center of distribution of the species, is best considered adventive. However, the presence of the species in Oklahoma and Arkansas is better regarded as slightly disjunct and naturally occurring. This is supported by the proximity of the locations to where the species occurs in Texas, the similarity of their habitats, and the large number of individuals present that exhibited considerable morphological variation.

ACKNOWLEDGMENTS

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VASCULAR UNDERSTORY PLANT COMPOSITION IN A MICROTOPOGRAPHIC SETTING, ATCHAFALAYA BASIN, LOUISIANA

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ABSTRACT

Understory plant frequencies were recorded in a microtopographic setting in the Atchafalaya Basin, Louisiana during summer 1993 and summer 1994. Microtopography on the study area greatly influences duration of inundation. Habitat preferences of many herbs and woody seedlings to either bottomland hardwood ridges or slightly lower baldcypress-tupelogum swales were apparent. Other species were generalists and occurred commonly in both habitat types. Of the 87 taxa recorded, mostly at the species level, 49 showed affinities to bottomland hardwood ridges and 9 to baldcypress-tupelogum swales.

KEYWORDS: Atchafalaya Basin, Louisiana, plant frequencies

INTRODUCTION AND STUDY AREA

Understory plants were recorded in the Atchafalaya Basin, Louisiana during the summers of 1993 and 1994 as a component of studies aimed to assess wildlife habitat following Hurricane Andrew, which impacted the area in August, 1992. Studies on plant distribution relative to elevation in bottomland forests of the southeastern U.S. have focused primarily on woody plants. Data presented here details herbaceous plant and woody seedling abundance and could be useful in planning projects that aim to restore bottomland hardwood and baldcypress-tupelogum forests in interspersed, microtopographic settings and could perhaps be useful in refining regional wetland indicator statuses of plants.

The study area is located south of Interstate 10 between the Atchafalaya and Mississippi Rivers in Iberville Parish, Louisiana. Thirty-three study plots were located approximately 10 km south of Ramah in sections 59 and 61 (T8S-R10E). Fifteen plots were located approximately 10 km west of Plaquemine and 15 km east of the above-mentioned plots in section 9 (T9S-R11E).

The study area occurs at elevations less than 3.0 m mean sea level (msl) (U.S.D.I. Geol. Surv. 1953a and 1953b) within a very gentle ridge-swale complex that results in an interspersion of two forest types: Bottomland hardwood forests occupying slightly elevated areas (hereafter referred to as "ridges") with an overstory comprised mainly of *Acer negundo*, *Acer rubrum*, *Celtis laevigata*, *Fraxinus pennsylvanica*, *Liquidambar styraciflua,* and *Ulmus americana*; and baldcypress-tupelogum forests (hereafter referred to as "swales") occupying slightly lower areas comprised of *Taxodium distichum* and *Nyssa aquatica*, but also supporting *Acer rubrum*, *Celtis laevigata* and *Fraxinus pennsylvanica.*

In addition to the presence of two forest types, the study area was characterized by pulpwood [less than 25 cm diameter at breast height (dbh)] and sawtimber (greater than 25 cm dbh) sized trees and different degrees of hurricane damage (see Helm 1995; Salyer 1995). Understory plant frequencies with respect to every combination of forest type, tree size, and degree of hurricane damage for each sampling period are appended in Helm (1995), but the present paper will address microtopographic effects as indicated by forest type.

Small elevational differences greatly impact durations of flooding within the study area. Water typically inundates swales from late winter through early summer, while ridges typically support some standing water during this time period, primarily after heavy rainfall. Ridge plots were typically dry during understory vegetation sampling in the summers of 1993 and 1994 while many swale plots supported some shallow standing water. Non-inundated areas of swale plots during summer typically supported saturated soils to the surface. Rain is the primary source of water in the study area but water influx from flooding of nearby bayous occasionally occurs. Deep water baldcypress-tupelogum swamps are characterized by standing water throughout the growing season (Huenneke and Sharitz 1986). Swales in the study area can be considered shallow water baldcypress-tupelogum swamps and provide opportunity for germination of a diversity of species during the summer because of the general availability of non-inundated ground.

Sharkey clay and Fausse association soils have been mapped on the study area (U.S.D.A. Soil Conserv. Serv. 1977). They formed in clayey alluvium during the Holocene and are considered hydric soils (U.S.D.A. Soil Conserv. Serv. 1995). The Sharkey series (very fine, montmorillonitic, nonacid, thermic, Vertic Haplaquepts) consists of poorly drained, very slowly permeable soils on slopes of 0-3% and occurs at elevations from 1.5-6.1 m msl on low and intermediate parts of natural levees of the Mississippi River and its distributaries. The Fausse series (very fine, montmorillonitic, nonacid, thermic, Typic Fluvaquents) consists of very poorly drained, very slowly permeable soils on slopes less than 0.5% and occurs at elevations less than 3.0 m msl in backswamps (U.S.D.A. Soil Conserv. Serv. 1977). On the study area, Sharkey soils are more typical of ridges and Fausse soils of swales.

METHODS

It became apparent when in the field and upon analysis of plant frequencies data, that many taxa showed marked differences in abundance with respect to forest type but not with respect to tree size or degree of hurricane damage and, therefore, understory plant frequency would be best presented with respect to forest type. Effects of light penetration, however, are discussed briefly below. Also, records of plants recorded during winter are noted below.

Study plots were established during summer 1993. Data were recorded within 1 m^2 quadrats during summer 1993 and summer 1994. Quadrats resulted from division of 4 m^2 subplots. Four subplots were randomly located within each of 48, 0.1 ha plots resulting in 768 quadrats. Equal numbers of plots were established on ridges and in swales.

Understory vegetation included plants that were no taller than 1 m. Presence of understory plants was recorded by taxon in each quadrat. Plants were required to be rooted in a quadrat to be considered present. Within each forest type, frequency was calculated for each plant taxon; frequency equal to the percent of quadrats in which at least one plant of a given taxon occurred.

Paired t-tests were used to detect differences in plant taxon frequencies, mostly at the species level, on ridges versus swales for summer 1993 and summer 1994 combined. Alpha=0.05 was the significance level chosen for each taxon-based test.

RESULTS AND DISCUSSION

Differences in understory plant frequencies on the study area are believed to have resulted primarily from species-specific sensitivity to varying degrees of wetness with respect to abilities of plants to germinate and grow. Flood frequency and duration (hydroperiod) are the primary factors influencing woody plant distribution in bottomland forests of the southeastern U.S. (Grell et al. 2005; Wall and Darwin 1999). Of the 87 taxa recorded during summers 1993 and 1994, 49 showed affinities to ridges and 9 to swales. Extremely low p-values ($\leq$ 0.01) were associated with many of the taxa, both herbs and woody seedlings, indicating strong habitat affinities (Table 1).

Woody seedlings with strong affinities to ridges included *Acer negundo*, *Cornus drummondii*, *Forestiera acuminata*, *Ilex decidua*, *Liquidambar styraciflua*, *Planera aquatica*, *Sabal minor*, and *Sambucus canadensis*. Only *Acer rubrum* showed a strong affinity to swales. *Celtis laevigata*, *Fraxinus pennsylvanica*, and *Ulmus americana* seedlings were common in both ridge and swale habitats (frequencies per $m^2 \geq 5\%$ in each habitat type) and could be considered generalists with respect to elevation at the seedling stage. Among woody vines, *Berchemia scandens* was common in both habitats. Although not identified to species level, *Rubus* spp. was abundant and showed a strong affinity to ridges.

Species with strong affinities to ridges included *Asplenium platyneuron*, *Campsis radicans*, *Cocculus carolinus*, *Duchesnea indica*, *Elephantopus tomentosus*, *Eupatorium semiserratum*, *Hydrocotyle umbellata*, *Lonicera japonica*, *Melothria pendula*, *Oplismenus setarius*, *Parthenocissus quinquefolia*, *Perilla frutescens*, *Polygonum virginianum*, *Sanicula canadensis*, *Thelypteris palustris*, and *Vitis rotundifolia*. Conversely, *Eclipta prostrata*, *Phanopyrum gymnocarpon*, *Pluchea foetida*, *Rhynchospora corniculata*, and *Senecio glabellus* showed strong affinities to swales. *Ampelopsis arborea, Boehmeria cylindrica*, *Brunnichia ovata*, *Justicia ovata*, and *Vitis aestivalis* were common in both habitats. Many of the taxa, both woody and herbaceous, that showed no habitat affinity occurred in low frequencies. In these cases, habitat affinities may be obscured by the statistical inability to demonstrate differences in frequencies between habitat types because of sample size limited by inherent plant abundance.

The dominant overstory species in swales, *Taxodium distichum* and *Nyssa aquatica*, were sparsely represented as seedlings. Conversely, dominant overstory species on ridges (*Acer negundo*, *Acer rubrum*, *Celtis laevigata*, *Fraxinus pennsylvanica*, and *Ulmus americana*) were well represented as seedlings on ridges. *Acer rubrum*, *Celtis laevigata*, and *Fraxinus pennsylvanica*, all represented in the overstory in swales but to a lesser degree than *Taxodium distichum* and *Nyssa aquatica*, were common as seedlings in swales. *Taxodium distichum* can germinate and develop under partial shade while *Nyssa aquatica* is shade intolerant. Neither can germinate under inundated conditions and both can be adversely affected in the seedling stage by prolonged flooding (Burns and Honkala 1990). Also, various microsite characteristics can influence seedling abundance of both species (Huenneke and Sharitz 1986). As seedlings of less water tolerant species were numerous even in swale plots, prolonged flooding was not thought to have adversely affected seedling establishment of *Taxodium distichum* and *Nyssa aquatica*. Low seedling abundance of *Nyssa aquatica* may be related to the generally dense forest canopy (see discussion below on light penetration and understory plant abundance). Factors resulting in the paucity of *Taxodium distichum* seedlings are not clear.

NOTES ON LIGHT PENETRATION AND UNDERSTORY PLANT ABUNDANCE

As noted above, the study was conducted in areas of pulpwood (high value timber was harvested during the 1960's) and sawtimber sized trees and varying degrees of damage from Hurricane Andrew. Although this paper focuses on microtopographic influences on plant abundance, overstory canopy cover, an indicator of light penetration, is another potentially important factor affecting plant occurrence (Menges and Waller 1983) and will be summarized here. For a more detailed discussion on overstory-understory relationships on the study area, see Helm (1995) and Helm and Chabreck (2004). Overstory canopy cover was measured on the study plots using a spherical densitometer (Lemmon 1956) held at a height of 1 m and showed no differences in plots characterized by pulpwood versus sawtimber sized trees or ridges versus swales but was dependent on degree of hurricane damage. Differences in understory plant frequencies with respect to degree of hurricane damage, however, emerged only several times when analyzing data, and could be statistical artifacts of the large number of taxa studied. While degree of hurricane damage dictated amount of overstory canopy cover, amount of light penetration to the forest floor may not have been related to hurricane damage one year after the hurricane during summer 1993 because of leaf production on downed trees that provided shade but were not entirely accounted for in readings of overstory canopy cover. Tree death and resultant leaf loss two years after the hurricane in summer 1994, however, was thought to have resulted in differences in light penetration to the forest floor with respect to degree of hurricane damage and affected understory cover, understory cover being greater in heavily damaged plots than in moderately and lightly damaged plots. Differences in light penetration during summer 1994, however, although difficult to absolutely quantify, were apparently not great enough to produce taxon-specific differences in understory plant frequencies.

NOTES ON PLANTS RECORDED DURING WINTER

Understory plants were also recorded on the study plots during January 1995 and are appended in Helm (1995). During winter 1995 sampling, swale plots supported varying depths of standing water (hip waders were often required) while ridge plots often had some shallow standing water. Many herbs were in the seedling stage at time of sampling. Taxa recorded during winter that were not recorded during either of the summer sampling periods are noted below in order to provide a more complete botanical account of the study area: *Andropogon* spp., *Cardamine pensylvanica* Muhl. *ex* Willd., *Carex* spp., *Chaerophyllum tainturieri* Hook., *Cirsium horridulum* Michx., *Commelina* sp., *Cyperus articulatus* L., *Erigeron philadephicus* L., *Galium aparine* L., *Geranium carolinianum* L., *Geum canadense* Jacq., *Gnaphalium* spp., *Ilex vomitoria* Ait., *Lobelia cardinalis* L., *Nemophila aphylla* (L.) Brummitt, *Physalis heterophylla* Nees, *Pleopeltis polypodioides* (L.) Andrews & Windham, *Quercus laurifolia* Michx., *Quercus phellos* L., *Quercus virginiana* P. Mill., *Spiranthes ovalis* Lindl., *Stellaria media* (L.) Vill., and *Urtica chamaedryoides* Pursh.

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Table 1. Mean understory plant frequency per m^2 for summers 1993 and 1994 (combined), differences in frequencies between forest types (bottomland hardwood ridges and baldcypress-tupelogum swales) (reported for $P \leq 0.05$), and habitat affinities in the Atchafalaya Basin, Louisiana. [1]Scientific names in accord with Kartesz (1994).

	Frequency			
Scientific Name and Author[1]	Ridge	Swale	p-value	Habitat
Acer negundo L.	22.4	9.9	5×10^{-5}	Ridge
Acer rubrum L.	14.7	24.3	0.004	Swale
Acmella oppositifolia (Lam.) R.K. Jansen	0.3	0.7		
Ampelopsis arborea (L.) Koehne	27.3	23.6		
Ampelopsis cordata Michx.	4.0	9.1	0.04	Swale
Asimina triloba (L.) Dunal	2.2	0.0	0.05	Ridge
Asplenium platyneuron (L.) B.S.P.	2.5	0.0	0.01	Ridge
Aster spp. L.	2.3	0.5		
Berchemia scandens (Hill) K. Koch	12.9	14.0		
Boehmeria cylindrica (L.) Sw.	55.2	54.8		
Brunnichia ovata (Walt.) Shinners	9.2	6.9		
Campsis radicans (L.) Seem. *ex* Bureau	12.0	3.0	0.005	Ridge
Carya aquatica (Michx. f.) Nutt.	0.0	0.5		
Celtis laevigata Willd.	23.2	26.8		
Cephalanthus occidentalis L.	0.3	0.0		
Ciclospermum leptophyllum (Pers.) Sprague	1.0	0.1	0.05	Ridge
Cirsium spp. P. Mill.	6.3	0.4	4×10^{-5}	Ridge
Cocculus carolinus (L.) DC.	3.5	0.3	0.004	Ridge
Cornus drummondii C.A. Mey.	9.2	1.7	6×10^{-5}	Ridge
Crataegus spp. L.	0.5	0.0	0.05	Ridge
Cynodon dactylon (L.) Pers.	3.1	0.4	0.03	Ridge
Cyperaceae	16.0	41.7	2×10^{-5}	Swale
Desmodium spp. Desv.	0.8	0.1	0.05	Ridge
Dichondra carolinensis Michx.	1.3	0.1	0.02	Ridge
Diodia virginiana L.	0.5	2.0		
Diospyros virginiana L.	1.2	0.4		
Duchesnea indica (Andr.) Focke	10.6	1.0	7×10^{-5}	Ridge
Eclipta prostrata (L.) L.	0.8	8.3	0.002	Swale
Elephantopus tomentosus L.	5.6	0.1	3×10^{-5}	Ridge
Eupatorium semiserratum DC.	30.3	5.0	9×10^{-6}	Ridge
Forestiera acuminata (Michx.) Poir.	1.8	0.0	0.009	Ridge
Fraxinus pennsylvanica Marsh.	16.4	11.6		
Gleditsia triacanthos L.	0.3	0.3		
Hamamelis virginiana L.	0.0	2.2		
Heliotropium spp. L.	0.0	0.9		
Hydrocotyle umbellata L.	16.9	6.0	0.0005	Ridge
Hypericum spp. L.	0.1	0.5		
Ilex decidua Walt.	3.5	1.2	0.01	Ridge
Ilex opaca Ait.	0.1	0.0		
Justicia ovata (Walt.) Lindau	9.0	10.9		
Leersia oryzoides (L.) Sw.	2.0	0.9		

Liquidambar styraciflua L.	4.7	0.7	0.002	Ridge
Lonicera japonica Thunb.	11.7	0.0	0.0004	Ridge
Ludwigia spp. L.	6.4	3.4		
Lythrum spp. L.	8.9	13.4		
Melothria pendula L.	17.3	1.1	1x10^{-6}	Ridge
Mikania scandens (L.) Willd.	3.8	6.8		
Nyssa aguatica L.	0.3	0.0		
Oplismenus setarius (Lam.) Roemer & J.A. Schultes	52.2	4.4	5x10^{-13}	Ridge
Oxalis spp. L.	1.8	0.0	0.01	Ridge
Panicum spp. L.	8.5	1.8	0.03	Ridge
Parthenocissus quinquefolia (L.) Planch.	47.3	9.9	7x10^{-8}	Ridge
Perilla frutescens (L.) Britt.	4.3	0.0	0.01	Ridge
Phanopyrum gymnocarpon (Ell.) Nash	1.6	11.3	0.001	Swale
Phyla lanceolata (Michx.) Greene	0.0	0.1		
Phytolacca americana L.	0.3	0.0		
Planera aquatica J.F. Gmel.	7.8	1.3	0.01	Ridge
Plantago spp. L.	0.0	0.1		
Platanus occidentalis L.	0.0	0.3		
Pluchea foetida (L.) DC.	0.8	17.5	2x10^{-6}	Swale
Poaceae	10.4	2.7	0.005	Ridge
Polygonum spp. L.	20.0	17.7		
Polygonum virginianum L.	26.0	3.3	1x10^{-7}	Ridge
Quercus spp. L.	4.0	1.2	0.002	Ridge
Rhynchospora corniculata (Lam.) Gray	0.1	7.0	4x10^{-5}	Swale
Rubus spp. L.	67.2	16.4	3x10^{-13}	Ridge
Sabal minor (Jacq.) Pers.	1.6	0.0	0.004	Ridge
Sambucus canadensis L.	4.8	0.5	0.004	Ridge
Samolus valerandi L.	0.1	0.7		
Sanicula canadensis L.	23 7	1.7	5x10^{-8}	Ridge
Saururus cernuus L.	16.2	25.6	0.03	Swale
Senecio glabellus Poir.	3.9	21.5	0.0005	Swale
Sisyrinchium albidum Raf.	0.0	0.7		
Smilax spp. L.	9.8	2.7	0.0003	Ridge
Solanum carolinense L.	0.3	0.5		
Solidago spp. L.	2.3	0.3	0.02	Ridge
Sonchus oleraceus L.	0.0	0.1		
Taxodium distichum (L.) L.C. Rich.	0.0	0.7		
Thelypteris palustris Schott	16.9	1.4	5x10^{-8}	Ridge
Toxicodendron radicans (L.) Kuntze	60.0	46.3	0.01	Ridge
Trachelospermum difforme (Walt.) Gray	0.1	0.5		
Tradescantia ohiensis Raf.	1.3	1.2		
Ulmus americana L.	17.4	9.5		
Vicia spp. L.	0.5	0.0		
Viola spp. L.	20.3	2.4	4x10^{-9}	Ridge
Vitis aestivalis Michx.	8.9	9.8		
Vitis rotundifolia Michx.	5.3	0.8	0.01	Ridge

PARAPHYMATOCEROS HÄSSEL, GEN. NOV. (ANTHOCEROTOPHYTA)

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ABSTRACT

Paraphymatoceros Hässel gen. nov. is described. It includes three species, *P. diadematus* Hässel sp. nov. from Chile, *P. hallii* (Austin) Hässel comb. nov. from USA and *P. minutus* (Mitt.) Hässel comb. nov. from South Africa. It differs from *Phymatoceros* Stotler, W. T. Doyle & Crand.-Stotl. in having a different kind of tuber, number of antheridia and spore wall ornamentation.

KEYWORDS: Anthocerotophyta, *Phymatoceros*, *Paraphymatoceros*, Chile, USA, South Africa.

Paraphymatoceros Hässel gen. nov.

Thallus angustus, tenuis, tuberis scutiformibus marginalibus vel apicalibus viridulis vel auranticis. Capsula stomatophora cum columella. Sporae et pseudoelateres flavescentes vel nigrescentes, superficie distalis gibbosa, centrum areis triangularibus proximalibus baculis instructis. Differt a Phymatoceros tubera neque sphaerica neque pedunculata.

Type species: *Paraphymatoceros diadematus* Hässel

This genus is distinct from *Phymatoceros* Stotler, W. T. Doyle & Crand.-Stotl. by the antheridia which are more numerous per cavity, the tubers present under the notch of growing points at wide incipient lobes or at tips of narrow lobes, are scuteliform, nearly plane dorsally with a laminar border which continues from the thallus border, and bulging ventrally, covered with rhizoids. The sporophyte has a dehiscence line between two rows of yellow to orange coloured thick walled cells, seen in young capsules, as happens in *Notothylas*. The spores show on distal surface a number of rounded protuberances and the proximal surface a conspicuous triradiate mark with margo, and triangular areas with a circle of distinct baculae. I place *Paraphymatoceros* into Notothyladaceae (Milde) Müll. Frib. ex Prosk. subfamily Phaeocerotoideae Hässel.

Paraphymatoceros comprises three species:

1. Paraphymatoceros diadematus Hässel **sp. nov.** Type: Chile, Quebrada Aguas Claras, s.d., *Villagrán 1115B* (STGO).

Thallus angustus, tenuis, tuberis scutiformibus marginalibus et apicalibus viridulis vel auranticis. Cellulis 1 chloroplastis sine pirenoidibus. Dioica. Antheridia 4-5 per cavitate. Capsula stomatophora cum columella, superficie interna denigrata. Sporae et pseudoelateres nigrescentes, superficie distalis gibbbosa, centrum areis triangularibus proximalibus baculis coronatis.

Thalli strap shaped, crowded, or in rosettes, solid but thin, with scuteliform marginal and apical tubers, with *Nostoc* colonies; cells with 1 chloroplast without pirenoid. Dioicous. Antheridia 4-5 per cavity. Capsules abundant, long, pluristratose with stomata and columella; dehiscence line with border of orange coloured thick walled cells; cells of inner surface of valves dark brown at maturuty of spores. Spores yellow, later blackish brown, distal surface with several irregular to 5 rounded protuberances and cingulum; proximal surface with triangular areas separated by a very distinct trilete mark and margo, in the center of the triangular areas a crown of baculae surrounding a depressed area (which gives the name of the species). Pseudoelaters blackish brown, 4 celled, disintegrating.

Other specimens examined: Chile, Cordoba, *Villagrán 1029, 1038* (STGO).

2. Paraphymatoceros hallii (Austin) Hässel **comb. nov.** Basionym: *Anthoceros hallii* Austin, Bull. Torrey Bot. Club 6: 26. 1875. Lectotypus: Oregon, Silverton. *E. Hall* (MANCH 21217 !); paratypi: Oregon, Salem, *E. Hall* (NY !), California, Marwin.; ≡ *Phaeoceros hallii* (Austin) Prosk., Bull. Torrey Bot. Club 78: 347, 1961; = *Anthoceros sulcatus* Austin, Bull. Torrey Bot. Club 6: 27. 1875.

Isotypi: Oregon, Salem on moist soil, *E. Hall* (MANCH 21223 !, NY !); ≡ *Notothylas hallii* Austin ms

Howe (1898) provided a detailed description of this species under the name *Anthoceros hallii* Austin. The tubers are described as lobes often terminating in irregular yellowish-brown to olive-green glandular thickenings, 2-3 mm broad, sometimes descending and tuber like. Spores were described and illustrated by Hässel de Menéndez (1989: 731, pl. 7 fig. 13 a-d).

3. Phymatoceros minutus (Mitt.) Hässel **comb. nov.** Basionym: *Anthoceros minutus* Mitt., J. Linn. Soc. Bot. 16: 195, 1877. Holotypus: Base of Table Mts., Cape of Good Hope, Rev. *A. E. Eaton* (NY!). ≡ *Notothylas minutus* (Mitt.) Steph. Spec. Hep. V:1021, 1916; ≡ *Phaeoceros minutus* (Mitt.) S.W.Arnell, ...South Africa 1963.

The morphology of this taxon was described by Mitten (1877:195, pl. V, fig. 5-9), emphasizing the the details of the thallus and the sporophyte, including the apex of the capsules. Tubers were not mentioned. Stephani (Species Hepticarum V, 1916:997) described the taxon as *Anthoceros minutus* Mitt., citing Table Mountains and Venus Expedition. Stephani wrote "...ramis angustis, tuberiferis, tubera longe stipatis,... sporae fuscae, ... antheridia desunt." In the same volume Stephani (1916:1021) described the taxon under *Notothylas minutus* (Mitt.) Steph. from Mons. Tabularis, citing Mitten's publication. His diagnosis included "...frons solida, irregulariter multiramosa, sublacerata, marginibus tuberifera, sporae fuscae, androecia in ramulis propiis, sparsa, antheridia desunt." Arnell (1963:403, fig. 290) transfered the taxon to *Phaeoceros minutus* (Mitt.) S. W. Arnell, only indicating it as endemic in Cape Province, Peninsula. In addition to the former descriptions he noted "...the lobes entire with mucilagineous cavernae, smooth or covered with globose gemmae, sometimes with short tuberous marginal branches." Male plants are also mentioned, probably from other specimens not indicated there.

The type specimen has been analyzed by the present author. The thallus appears to be solid, thin, with *Nostoc* colonies, multiramose with narrow elongated expansions, which have at their tips, underneath, the protruding tuber covered with rhizoids. The existence of a conical apex of the capsules, pointed out by Mitten and Arnell, was confirmed. Antheridia and gemmae have not been seen. The spores of the young sporophytes are yellow; the distal surface has nearly rounded protuberances, about 10 along the diameter; the proximal surface has a very distinct triradiate mark, margo and cingulum, and the triangular areas contain a ring of isolated baculae.

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My thanks to Dra. Carolina Villagrán for the collections of Hepatics and Hornworts from Chile which she provided for this study, and to Dr. Barbara Thiers (NY) for the specimen loan. I am also grateful to Drs Barbara Crandall-Stotler and Raymond Stotler who provided pertinent literature and had an interest in the subject For bibliographic help and assistance with the SEM I thank Mrs. Marta Rubies, Mr. Fabián Tricarico and Mr. Angel Fusaro of the Museo Argentino de Ciencias Naturales, Buenos Aires. This work was supported by the CONICET of Argentina. PIP 02076.

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SOLANUM TERGOSERICEUM (SOLANACEAE: SECT. BASARTHRUM): A NEW SPECIES FROM PERU

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ABSTRACT

This report presents a new species of nightshade from northern Peru. *Solanum tergosericeum* Ochoa **sp. nov.** (Dept. Cajamarca, prov. San Ignacio). The lower surface of its leaves are densely sericeus, whereas the upper surfaces are covered only with very fine hairs along the central veins of the leaflets. Additionally it has very small, pale violet, stellate corollas with whitish margins. The fruit is narrowly long-conic, and the apex is acute.

Key Words: *Solanum tergosericeum*, northern Peru, new species.

Solanum tergosericeum Ochoa, **sp. nov.** Fig. 1, 2.

TYPE: Peru: Dept. Cajamarca, prov. San Ignacio, Derrumbe Blanco, alt. ca. 1800 m, on the lower slopes of Montaña del Chaupe, driving upwards from Tamborapa towards Chaupe. Along the margins of humid, tropical forests, 1 May 1995. *C. Ochoa & A. Salas 16249* (Holotype MJP; Isotype MOL).

Plantae plerumque ascendentes interdum decubentes, 2-3 m attingentes. Caulis potius tenuis debilisque, sparse pilosus, simplex vel ramosus, internodiis 10-15 cm longis. Folia imparipinnata 8-17 x4-10 cm; petioli 7-10 mm longi; 5 paria foliola lateralia 0-1(-2) paribus interfoliolorum minusculorum. Foliola lateralia ad 5.5-1.0 cm valde anguste elliptico-lanceolata longe acuminata, ad basim oblique rotundata, subsessilia vel breviter petiolulata,, infima valde reducta, terminalium symmetricum longe acuminatum, cum cetera parce major. Folia adaxialiter nervo medio molliter pubescenti ceterum glabra, abaxialiter pilis tenuibus mollis adpressisimis superficie dense

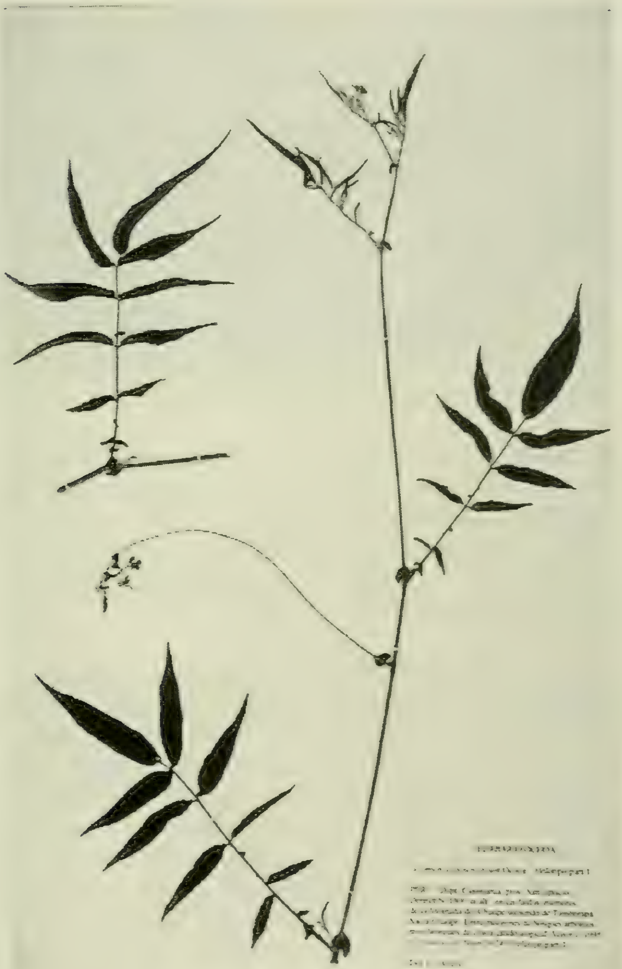

Fig. 1. Holotype of *Solanum tergosericeum* Ochoa.

argenteo-sericea eferens. Inflorescentiae laterales pedunculatae cymosae 8-10 floribus, pedunculo simplicitenui 7-12 mm ad basim articulato. Calyx 5-6 mm longus, sparse pilosus usque ad médium lobatus lobis lanceolatis vel angusti-lanceolatis acuminatissimis.

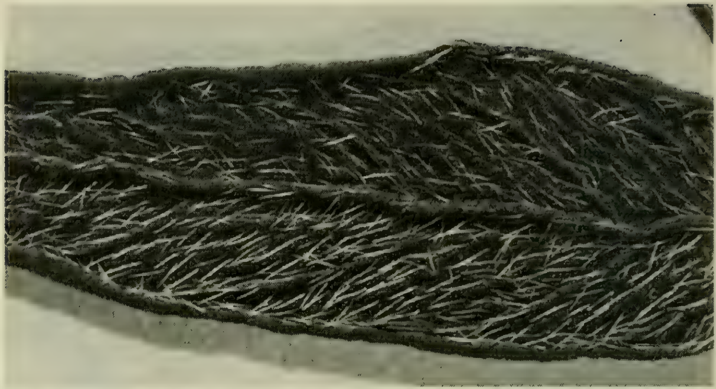

Fig. 2. Adaxial side of the foliole of *Solanum tergosericeum* Ochoa, x 15

Corolla stellata vel substellata 7-8 mm diametrum, pallide violacea marginibus albidis, lobis ellipticis vel late-ellipticis bene obtusis sed apice apiculato. Antherae 3.0-3.5 mm longae, anguste elliptico-lanceolatae, filamentis brevissimis fere obsoletis. Stylus 5 mm filiformis stamina 1.0-1.5 mm excedens. Stigma ovoideum. Fructus anguste elongato-conicus viridis, 10-12 x 3-4 mm.

Plants 2-3 m high, usually ascending or decumbent; stem weak, slender, sparsely pilose, simple or branched, internodes 10-15 cm long. Leaves odd-pinnate, 8-17 long by 4-10 cm wide, on petioles 7-10 cm long, and with 5 pairs of lateral leaflets and (0)-1(-2) pairs of very small interstitial leaflets; lateral leaflets up to 5.5 cm long and 1.0 cm wide, very narrowly elliptic-lanceolate with long-acuminate apices, rounded at the oblique base, subsessile or shortly petiolulate, the lowermost pair much reduced; terminal leaflet symmetrical, long acuminate, a little larger and wider than the laterals. Leaflets densely sericeous below, with very fine soft and long adpressed and silvery, simple or 2-celled hairs above, with soft hairs present only on the central vein of the leaflets and margins, the remaining surfaces glabrous. Pseudoestipular leaves falcate with acute apex, 6-7 mm long by 3-4 mm wide. Inflorescence lateral, cymose; 8-10 flowered; peduncle simple, slender, up to 12.5 cm long, glabrous to subglabrous; pedicels filiform, 7-12 mm long, articulate at the base. Calyx 5-6 mm long, very sparsely pilose, divided to about the middle into ovate-lanceolate or narrowly lanceolate acuminate lobes. Corolla stellate to sub-stellate, 7-8 mm in diam., light violet with white borders; lobes elliptic to broadly elliptic, very obtuse at the apiculate apex. Anthers 3.0-3.5 mm long, narrowly elliptic-lanceolate; filaments extremely short, almost obsolete; style ca. 5 mm long, filiform, exceeding the stamens by 1.0-1.5 mm; stigma ovoid. Fruit green, narrowly long-conic, with an acute apex, 10-12 mm long and 3-4 mm thick.

KEYS TO THE FLORA OF FLORIDA -- 13, *VITIS* (VITACEAE)

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ABSTRACT

Vitis (Vitaceae) is represented in Florida by 6 species. *Vitis aestivalis* is treated as consisting of 2 varieties. *Vitis rotundifolia* is believed to be formed of 3 varieties, with var. **pygmaea**, an endemic of the Florida peninsula, described as new. *Vitis simpsonii* is interpreted as specifically distinct from *V. cinerea*. Typical *Vitis cinerea* is excluded as based on misidentifications. An amplified key is given to the Florida taxa.

KEY WORDS *Vitis*, Vitaceae, Florida flora.

> "It is really astonishing to behold the Grape-Vines in this place. From their bulk and strength, one would imagine they were combined to pull down these mighty trees to the earth; when in fact, amongst other good purposes, they serve to uphold them. They are frequently nine, ten, and twelve inches in diameter, and twine round the trunks of the trees, climb to their very tops, and then spread along their limbs, from tree to tree, throughout the forest." William Bartram, *Travels*, 1791: 86-87. Near mouth of Tocoi Creek, east bank of St. Johns River, due west of St. Augustine, St. Johns County.

Species of *Vitis* (Vitaceae) are instantly recognized as (usually) high-climbing lianas with simple, palmately veined leaves and sweet, delectable to unpalatable, juicy fruits. Some are found widely throughout the state, their stems suspended beneath the branches of hammock trees and their foliage and fruits hidden and inaccessible in the canopy above. Others are restricted to bottomlands of major north Florida rivers or coastal shell mounds; one charming variant is known only from small areas of sand pine scrub in the central peninsula. But all of them are so unclearly separated by subtle features of morphology that misidentifications are common, by amateur enthusiasts and professional botanists alike.

These uncertainties have long stimulated efforts to determine the species and establish their characteristics and limits. J. K. Small (Manual of the Southeastern Flora. 1933) clearly understood most of the species and provided keys and descriptions still useful today. L. H. Bailey (Gentes Herbarum 3:151-244. 1934) went far toward working out their taxonomy, while G. K. Brizicky (J. Arnold Arbor. 46:48-67. 1965), W. H. Duncan (Sida 3:1-76. 1967), and R. K. Godfrey (Trees, Shrubs, and Woody Vines. 1988) provided descriptions, keys, and illustrations.

In recent decades three different parties have attempted to resolve remaining problems encountered in *Vitis*, both in the distinguishing characteristics and in the nomenclature and classification of the species. A major but often overlooked review of the Florida species was undertaken by D. J. Rogers and J. A. Mortensen (Proc. Florida State Hort. Soc. 92:286-289. 1979). But although the authors were Florida-based and provided much original insight, their focus was on horticultural use which encouraged them to emphasize small differences (they recognized five varieties of *Vitis aestivalis*) and to overlook matters of nomenclature.

Two significant taxonomic studies soon followed, of *Vitis* throughout the Southeast -- overlapping both in chronology and in purpose -- one in North Carolina (B. L. Comeaux at North Carolina State University), and one in Georgia (M. O. Moore at the University of Georgia). Through their efforts the limits of the species are now relatively well understood and their nomenclatural entanglements have been resolved. Even so, the Florida species are poorly defined in the eyes of many workers. And there is still room for useful refinement of the entities that form this component of the Florida flora.

The Simpson Grape, *Vitis simpsonii*, has been confused and often combined with the Summer Grape, *Vitis aestivalis* (Rogers & Mortensen, 1979). In the peninsula it is a plant of low, wet thickets, and can further be separated by several morphological characters, perhaps the best being the yellow-green pubescence and acuminate-tipped lobes. It never (or very rarely) has the deeply lobed, round-bottomed sinuses of *V. aestivalis*, which has bluish-green pubescence and rounded to acute lobes. Its nomenclature was clarified by B. L. Comeaux & P. R. Fantz (Sida 12:279-286. 1987), though they treated it as *V. cinerea* var. *floridana*. Although there may be intergradation with typical *V. cinerea* to the north and west, as maintained by Comeaux & Fantz (1987) and M. O. Moore (Sida 14:339-367. 1991), in Florida the differences in habitat and morphology are sufficient to justify retention of it at specific rank, as did Small (1933) and Bailey (1934).

The Florida scrub, a unique association of the central peninsula characterized by excessively drained sands and numerous endemic plant species (S. P. Christman & W. S. Judd, Florida Sci. 53:52-73. 1990), holds an unnamed variant of *Vitis rotundifolia*. This taxon, found in only a few locations in Polk and Highlands counties, has been known for many years, but without receiving appropriate taxonomic recognition. It appears first to have been noted by James B. McFarlin, a graduate student of the University of Michigan who spent many months in field work in Florida in the early 1930s, compiling a thesis on the flora of the Florida scrub in 1935, but in some manner failing to complete requirements for a degree. Yet his unpublished thesis has been a source of information and inspiration for other workers, some of whom have retained his manuscript names in later publications (e.g., J. Beckner, re *Lupinus aridorum* McFarlin ex Beckner, Phytologia 50:209-211. 1982).

The endemic *Vitis* noted by McFarlin was also encountered by Rogers & Mortensen (1979:288). Other than noting it to be a "small-leaved form," they gave it no description. They commented: "We believe that this form should be recognized and will, after further investigation, probably designate it as *V. munsoniana* forma *pygmaea*."

Rogers & Mortensen were surely correct in suggesting the small-leaved scrub *Vitis* to be related to *V. munsoniana* (or *V. rotundifolia* var. *munsoniana*). The scrub plant, adjacent to (though separated by habitat from) var. *munsoniana*, is perhaps some distance south of typical *V. rotundifolia*. The McFarlin thesis (which Rogers & Mortensen did not mention and perhaps did not see) also related the scrub plant to var. *munsoniana*, with a simple key for their separation.

That the labors of McFarlin, unacknowledged by his parent institution and unseen by later workers who unknowingly plowed the same fields, not be entirely lost, the name he used in manuscript and on label (noted by Rogers & Mortensen) is here formally employed in recognizing this small Florida endemic. His characters, with some modification, are also used in the accompanying amplified key.

Vitis rotundifolia Michx. var. **pygmaea** McFarlin ex D. B. Ward, **var. nov.** TYPE: Holotype: United States, Florida, Highlands Co.: sand dunes, Lake Jackson, Sebring, J. B. McFarlin 5707, 9 June 1931 ["flowers"] (US 1728170). Paratypes: Florida, Highlands Co.: sand dunes, Lake Jackson, Sebring, J. B. McFarlin 6524, 15 Aug 1931 ["fruits"] (US 1728171).

Similis V. rotundifolia *var.* munsoniana*, sed parvus, saepe non scandens, foliis 2 ad 3.5 cm. latus, raphe carina anguste.*

The writer is grateful to Dan H. Nicolson for images of the McFarlin types, and to Robert K. Godfrey for his patient exposition of the distinctions of the Florida grapes as seen in the field.

VITIS L. Grapes [1]

1. Tendrils simple, unforked; bark of main stems tightly adhering for several years before beginning to shred; lenticels evident on both young and older stems; flowers and berries in globular or slightly elongated bunches; leaves glossy green, glabrous (except for tufts of hairs in axils of main veins on lower surface), dentate, unlobed (or with one exceptionally large tooth on each margin). High-climbing woody vine (usually). Moist to dry soils. Spring.
MUSCADINE GRAPE. **Vitis rotundifolia** Michx.

   a. Berries >1.5 cm. dia., pulpy, with thick and tough skin, usually in clusters of 2-8; seeds >8 mm. long. Thickets, hammocks. Panhandle and north Florida, south into upper peninsula; common. [*Muscadina rotundifolia* (Michx.) Small]
   MUSCADINE GRAPE (typical). var. **rotundifolia**

   a. Berries <1.0 cm. dia., with little pulp and thinner skin, usually in clusters of 12-30 (or fewer in var. *pygmaea*); seeds <6 mm. long.

      b. Leaves 4-8 cm. dia.; raphe of seed broad and rounded; vines high-climbing. Hammocks, pinelands. Peninsula; common. Endemic. [*Muscadina munsoniana* (Simpson) Small; *Vitis munsoniana* Simpson]
      BULLACE GRAPE
      var. **munsoniana** (Simpson ex Munson) M. O. Moore

      b. Leaves 2-3.5 cm. dia.; raphe of seed narrow and ridged; vines usually shrub-like or trailing, at times weakly climbing. Sand pine scrub. Central peninsula (Polk, Highlands counties); rare. Endemic.
      PYGMY GRAPE. var. **pygmaea** McFarlin ex D. B. Ward

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[1] The "amplified key" format employed here is designed to present in compact form the basic morphological framework of a conventional dichotomous key, as well as data on habitat, range, and frequency. This paper is a continuation of a series begun in the 1970s (vide Phytologia 35: 404-413. 1977). Keys are being prepared for all genera of the Florida vascular flora, but the present "amplified" series is restricted to genera where a new combination is required or a special situation merits extended discussion.

1. Tendrils nearly all forked; bark of main stems beginning to shred in second year; lenticels inconspicuous or absent except on young stems; flowers and berries usually in elongated bunches; leaves dull green to tawny, glabrous to quite hairy beneath, dentate to serrate, unlobed or scarcely so, to deeply lobed.

    2. Leaves glabrous or very nearly so, the fully expanded blades with pubescence limited to tufts of hairs in axils of main veins on lower surface and sometimes on upper petiole, green beneath, never glaucous.

        3. Leaves unlobed or scarcely lobed, with acute to short-acuminate tips; twigs green to brown. Robust high-climbing woody vine. Moist to dry thickets, fence rows. Throughout; frequent (rare in s. peninsula). Spring. [*Vitis baileyana* Munson; *Vitis cordifolia* Lam.]
FROST GRAPE. **Vitis vulpina** L.

        3. Leaves strongly 3-lobed, the lobes with long-acuminate tips; twigs reddish or purplish. Slender high-climbing woody vine. Riverbottoms. Central panhandle (Jackson, Gadsden: Apalachicola River floodplain), disjunct to north Florida (Suwannee: Suwannee River); rare and local. Spring.
RED GRAPE, CATBIRD GRAPE. **Vitis palmata** Vahl

    2. Leaves pubescent, more so beneath, the hairs either short-spreading or cobwebby or both, rarely so sparse as to be subglabrous, if so, then glaucous beneath.

        4. Hairs on underside of leaf forming a dense, felted, evenly matted tomentum that wholly conceals the surface of fully expanded blades (although not always the major veins), the pubescence silvery-white to golden-orange; leaf blades shallowly toothed, angularly lobed (or deeply lobed on shoots). Woody vine, usually not high-climbing. Hammocks, sand pine scrub, shell mounds along the coasts. South and central peninsula (n. to Dixie, Flagler counties); infrequent. Spring. [*Vitis coriacea* Shuttlew.]
CALUSA GRAPE. **Vitis shuttleworthii** House

        4. Hairs on underside of leaf either dense or sparse, but in fully expanded blades the surface visible (at least under

magnification) between the hairs, the pubescence rusty to dull whitish.

5. Leaves with blue-green cast beneath, the tips rounded to acute, commonly unlobed or with slight angular shoulders, but usually with some vigorous shoots with deeply 3-5-lobed leaves in which the sinuses are broadly rounded with no primary veins terminating at the sinus margins; internodes terete; shade-grown shoots uniformly green (or uniformly red-pigmented in sun). Robust high-climbing woody vine, to 70 cm. circ. Moist to dry thickets, open woodlands; common. Spring.
SUMMER GRAPE, PIGEON GRAPE.
Vitis aestivalis Michx.

   a. Leaf margins coarsely serrate. Panhandle and north Florida. [*Vitis rufotomentosa* Small]
   var. **aestivalis**

   a. Leaf margins entire to crenate or obscurely and irregularly serrate. Peninsula. [*Vitis simpsonii*, misapplied; *Vitis smalliana* Bailey]
   var. **smalliana** (Bailey) Comeaux

5. Leaves with yellow-green cast beneath, the tips acute to short-acuminate, unlobed or with angular lobes with shallow and irregular sinuses with primary veins terminating at the sinus margins; internodes (for 3-5 internodes beyond stem tip) with flattened surfaces (perceptibly 4-6 sided when rolled between the fingers); shade-grown shoots green with red-pigmented nodes (sun-grown shoots uniformly red-pigmented). Moderately robust, low-climbing or often trailing woody vine. Wet woodlands, margins of marshes. Panhandle and north Florida, into northern peninsula (Alachua, Marion counties); frequent. Spring. [*Vitis aestivalis* Michx. ssp. *simpsonii* (Munson) Rogers; *Vitis austrina* Small; *Vitis cinerea* Engelm. ex Millardet var. *floridana* Munson; *Vitis sola* Bailey]
SIMPSON GRAPE. **Vitis simpsonii** Munson

Excluded names:

Vitis cinerea (Engelm. in Gray) Engelm. ex Millardet Downy Grape

Although often reported for Florida (Small, 1933; Godfrey & Wooten, 1981; Clewell, 1985; Wunderlin, 1998), no specimens of *V. cinerea* var. *cinerea* have been seen from the state. (Some specimens so named are *V. aestivalis*.) *V. cinerea* var. *floridana* is frequent, but is here treated as *V. simpsonii* (q.v.).

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Letter to authors and subscribers

Phytologia is changing its editor and its format. Volume 88(2) is the last issue for our current editor. I am in the process of procuring a new editor and making changes in the format to enhance the journal and improve the efficiency of publication by additional computer processing, faster response to authors and internet access that will give public access to journal articles as pdf files.

Beginning volume 88 (3), the December issue, a new editor and management will be announced.

Please send future manuscripts as computer files as previously formatted to me (see address below).

I would like to thank Justin Williams for his efforts as editor during the past three years.

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